INTRODUCTION

The Addo-X Class 3000 automatically applies the short-cut system in multiplication. Multiplicand, multiplier and result are printed on the control strip. The machine also adds and subtracts and can thus be used as an ordinary listing machine as well.

Machines of Model 3541 are equipped with two registers, like the 500-class. The first register adds and subtracts below zero [credit balance], while the second receives Totals from the first one only. As in 500, the second register can be cut out; it can also subtract, but not below zero.

As always, a perfect service requires a mechanic with a perfect knowledge of the machine. The information given in this Section is an aid to you in this respect, but first you must know what we have told about the basic model 341E and also the 500-class, as these models are incorporated in the 3541E. It is useful too, to know the 2000-class, or rather the principle of short-cut multiplication, which is the same in both models. Mechanically you will find the multiplication features entirely different.

A knowledge of how to use and operate the machine is advantageous as a logical background when studying the co-ordination of the mechanical functions. It is beyond the scope of this book, however, to educate you in this respect, but your co-operators on the sales side will surely be glad to lend you the pamphlet "Directions for Use with examples, Addo-X Model 3541," which tells you most of the story.

Pages 1 to 28 of Nov. 1962 supersede Pages I, II and 1 to 8 of earlier date.

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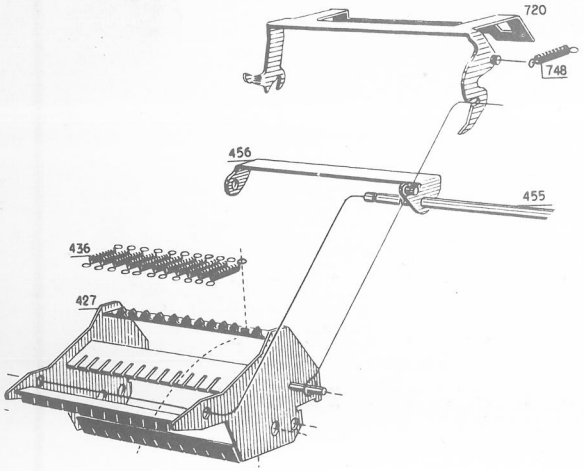

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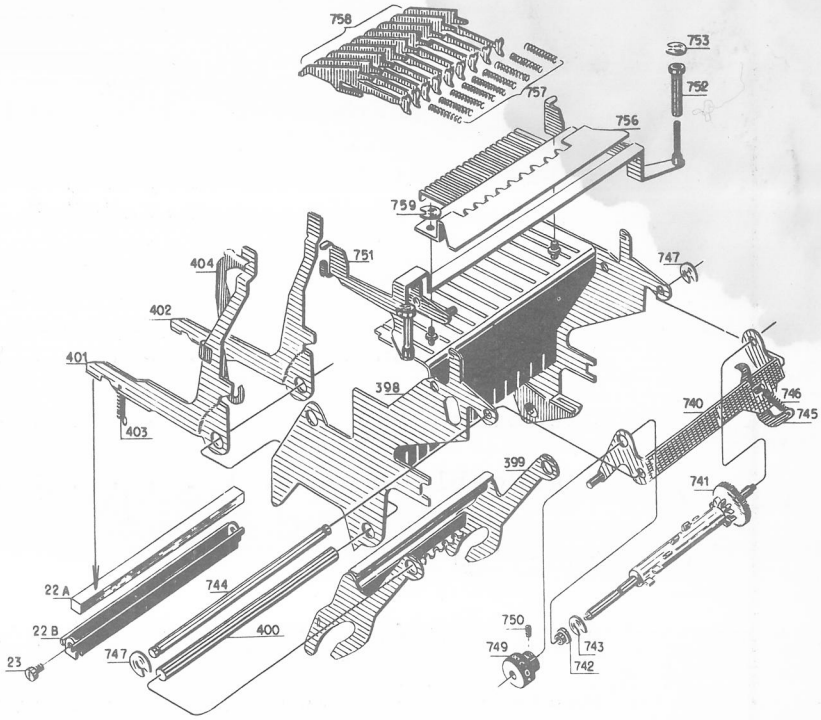

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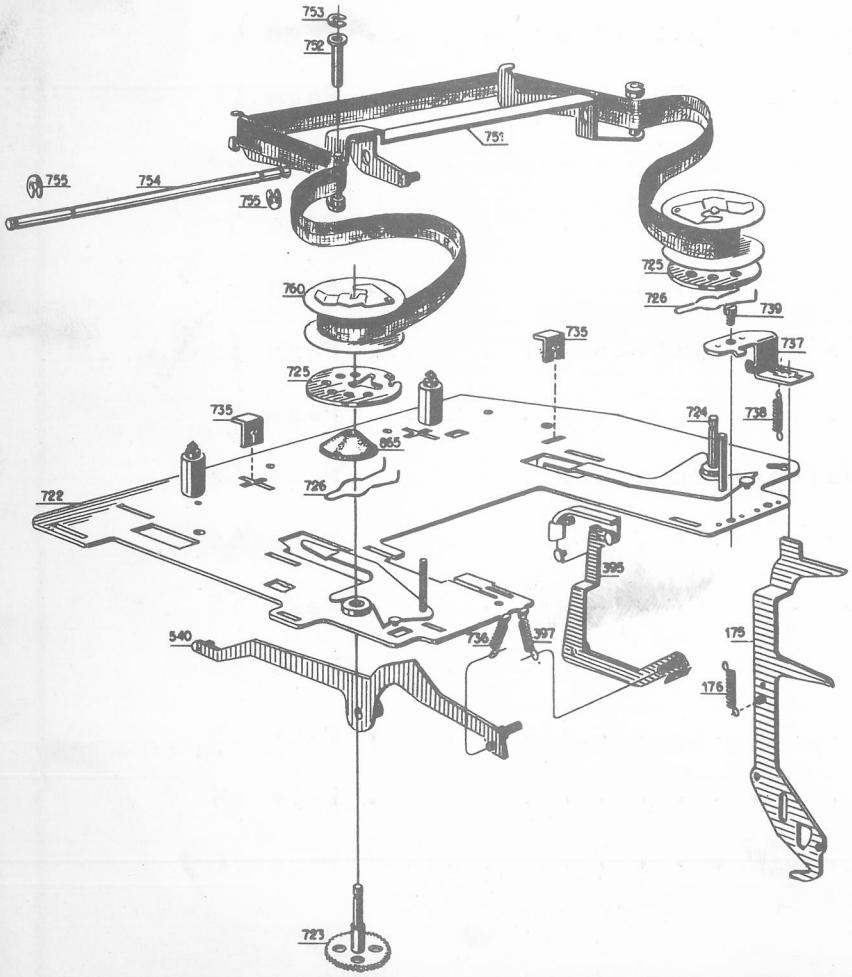

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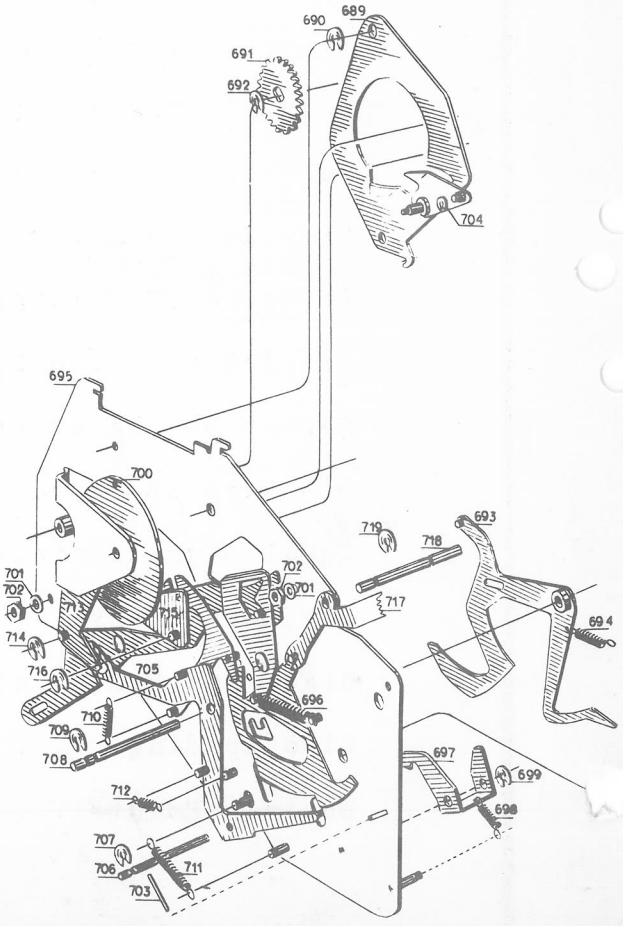

DISASSEMBLING ADDO-X 3000

[N.B. Numbers below must not be used when ordering spare parts]

Top Plate, Covers and Decimal Assembly

Remove:

1. Carriage, Cover and Bottom Cover. Attach four Supporting Feet R387. They are screwed into the holes which are normally used for the Rubber Foot Screws.

2. Decimal Frame [756], two Retainers [759] - Page 106.
3. Ribbon Guide [751], Shaft [754], 4 Retainers [755] - Page 103.
4. Decimal Setting Bridge [740], Shaft [744] and two Retainers [747] - Page 106.
5. Spring [748, Page 107], Spring [736, Page 103], Spring [397, Page 103] and Torsion Spring [568, Page 110].
6. Non Add Key Guide [737, Page 103].
7. Turn the machine one half cycle manually and lift off Top Plate [722, Page 103].
8. Take out Decimal Restoring Bridge [720, Page 107].

Outer Frame [695, Page 108]

9. Unhook Spring [694] for One-Turn Coupling [693] from Outer Frame Page 108.
10. Two Nuts [702] with Spring Washers [701] and Taper Pin [703] - Page 108.
11. Minus Rocker [713], Plus Rocker [715] and Retainer [704] from behind Plus Rocker - Page 108.
12. Retainer [709] from behind the Arm on the Upper Shaft [708], Retainer [707] behind the Plate on the Lower Shaft [706] - Page 108 [the outer retainers may be left on the shafts]. Take out the Shafts.
13. Springs [711 & 712] and Minus Rocking Lever [705] - Page 108.
14. Mult. Key Locking Bridge [717], Shaft [718] and two Retainers [719] - Page 108.

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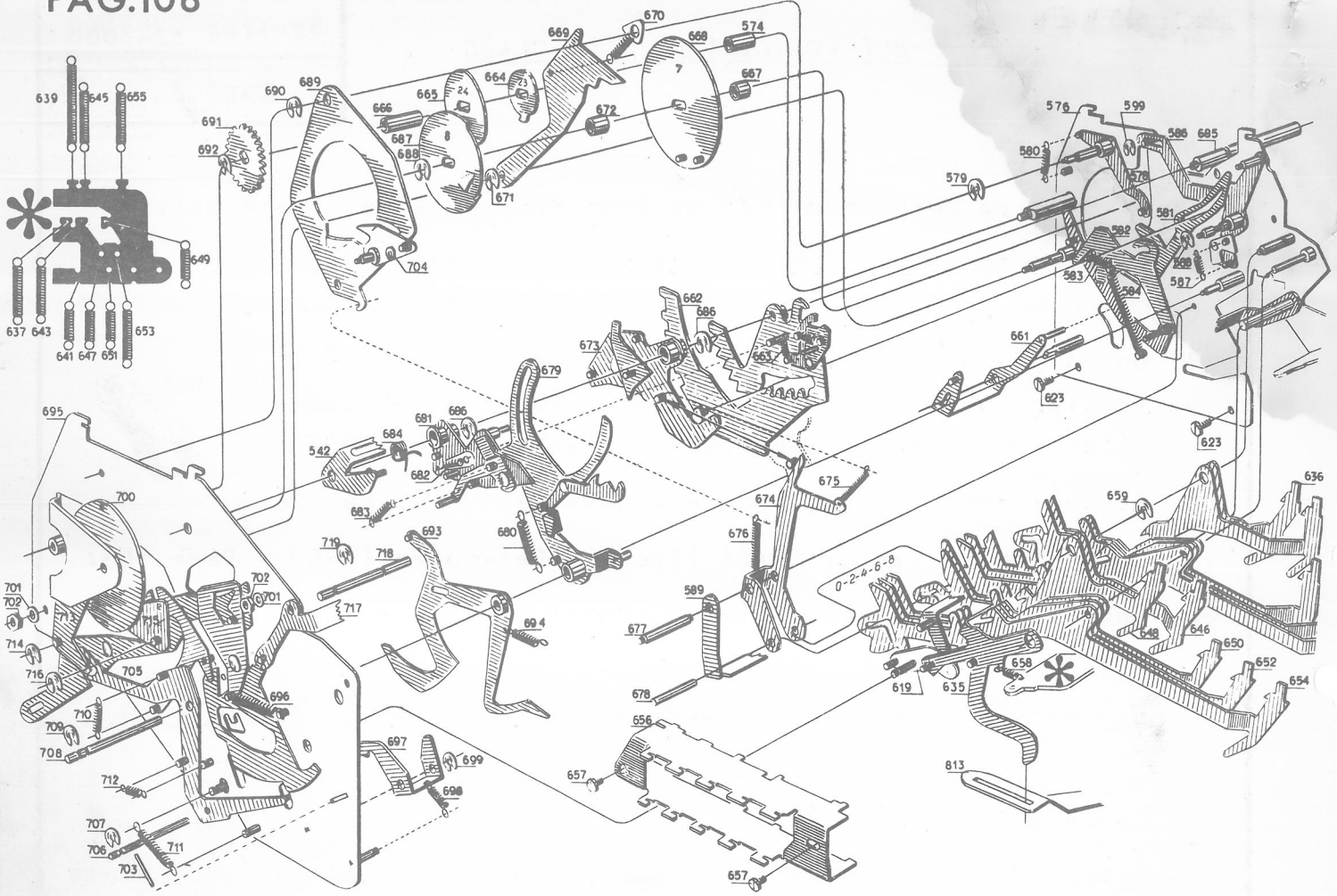

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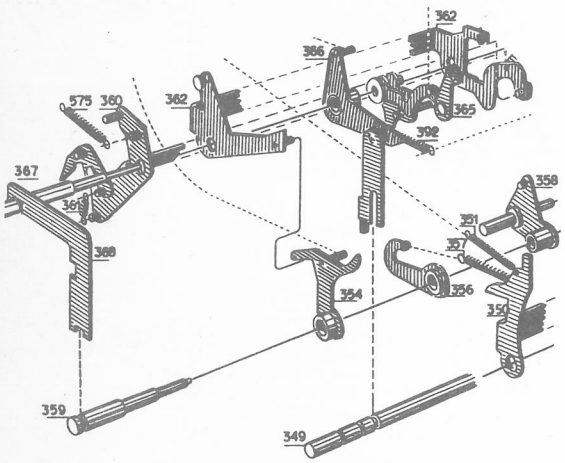

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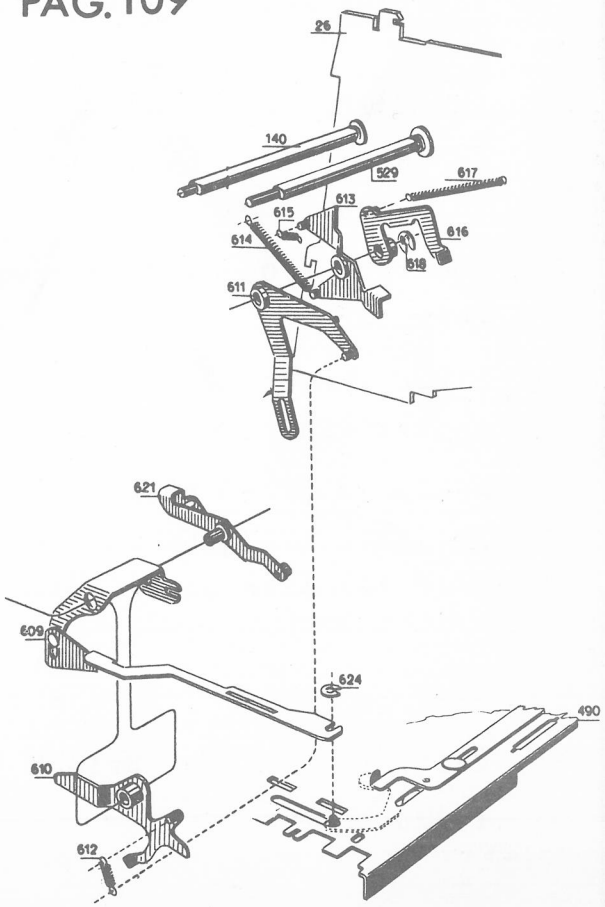

15. Outer Frame [695] with the Clutch Drive Plate [700] - Page 108.

Inner Frame Plate [576] and Key Box [656] - Page 108

Remove:

16. One Turn Coupling [693, Page 108].
17. Gear [691, Page 108] and Retainer [692, Page 108].
18. Guide Plate [689], two Retainers [690] and Spring [676] - Page 108.
19. Clutch Cam "8" [687] and Retainer [688] - Page 108.
20. Positioning Lever [669], Retainer [671] and Spring [670] - Page 108.
21. Space Collars [666 & 672, Page 108].
22. Shaft [685], two Retainers [686] and Springs [682 & 684] - Page 108.
23. Connecting Lever [681, Page 108].
24. Crossing Stroke Fork [679, Page 108].
25. Stroke Selector Bridge [674], Shafts [677 & 678] and Stroke Selector [673] - Page 108.
26. Register Segment Loading Cam "7" [668], Space Collar [667], Cam "24" [665] and Back Feed Cam "23" [664] - Page 108.
27. Register Segment [662, Page 108].
28. Minus Lever Actuator [661, Page 108].
29. Bottom Bearing Plate [813, Page 116].
30. Unhook Spring [617] from Lever Detent [616] - Page 109.
31. Unhook Spring [615, Page 109] from Bichrome Lever [523, Page 110].
32. Unhook Spring [575] from Start Keeping Bridge [360] - Page 111.
33. Remove two Mult. Box Screws [657] and two Screws [623] - Page 108.
34. Make the link of the Ball Locking Bridge [609] free from key-board [Retainer 624] - Page 109.
35. Remove carefully Key Box [656, Page 108] and Inner Frame Plate

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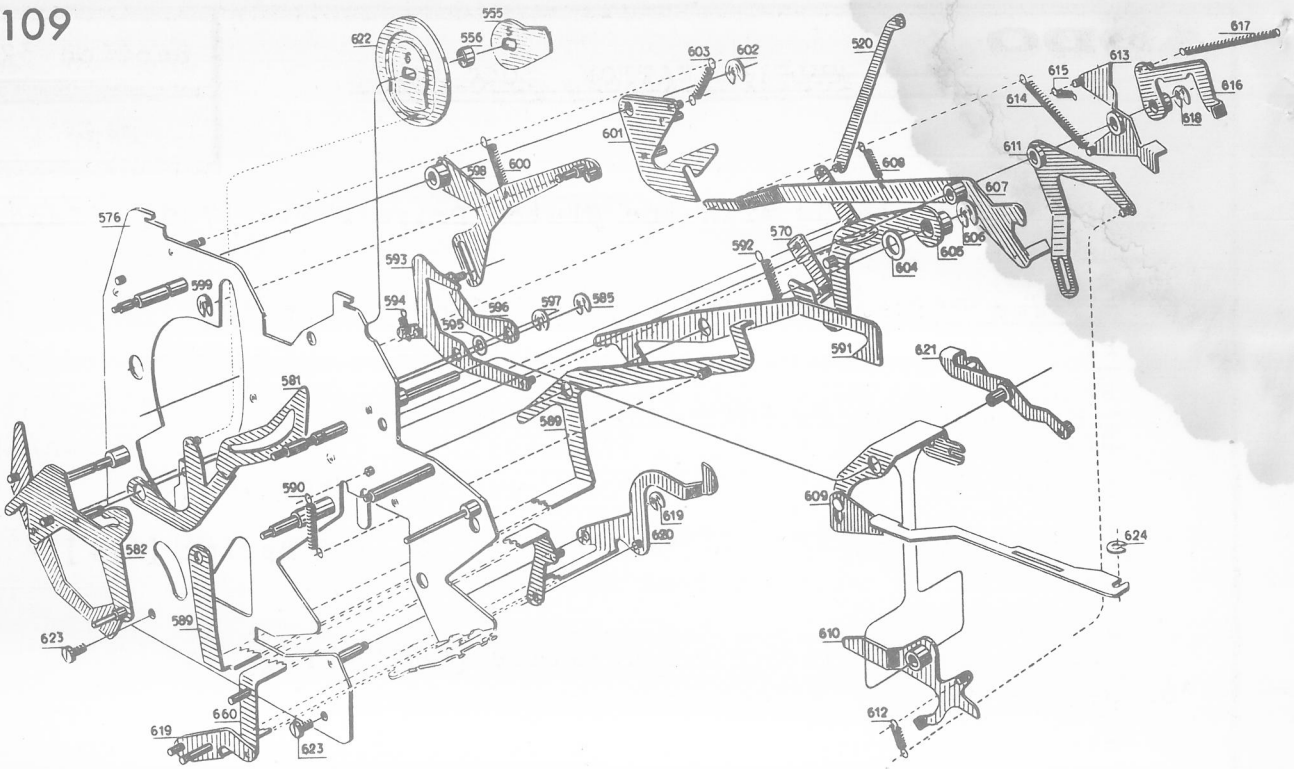

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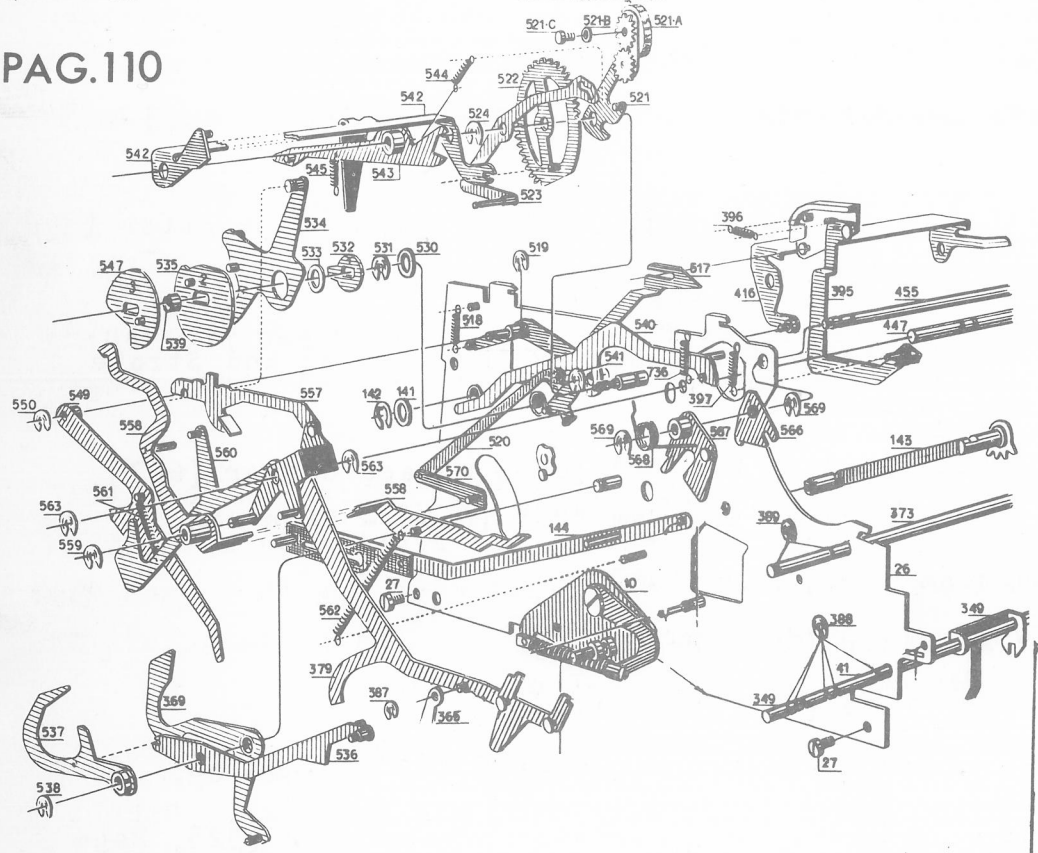

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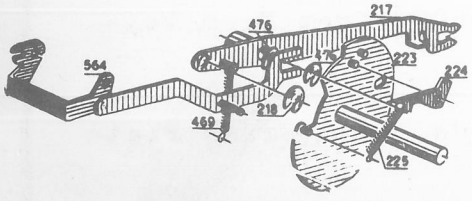

[576, Page 108] with Internal Cam "6" [622, Page 109] from the machine. Caution: Lift Red Print Rocker [613, Page 109] and Lever Detent [616, Page 109] free of the Plus/Minus Lever [352, Page 111]. The Plus Bridge [620, Page 109] and Add Retaining Bridge [660, Page 109] must be freed from the Start Keeping Bridge [360, Page 111]. Note that the Paper Feed Disengaging Lever [621, Page 109] is fulcrumed on the same stud as the Ball Locking Bridge [609, Page 109]. The Paper Feed Disengaging Lever can be removed from the machine only after the Inner Frame Plate has been taken off.

36. Remove Non Add Bridge [570, Page 110].
Should it be necessary to remove one or more parts from the Inner Frame Plate, this can easily be done without description.

Parts on the Left Side Frame

Remove:

37. Symbol Print Trigger [567] with spring, Symbol Eliminator [566] and Retainer [569] - Page 110.

38. Retainer at right end of Shaft [455, Page 110] and pull shaft leftwards until right side of Total Locking Lever [564, Page 113] comes free.

39. Remove Retainers on Shaft [447, Page 110], three on the left side and one on right side. Push Shaft rightwards until the Ribbon Feed Lever [557] with the Paper Feed Dog [558] and Paper Feed Cut Out Lever [560] becomes free and can be taken out together with Springs [561 & 562] - Page 110.

40. Cut Out Lever Detent [549] and Retainer [550] - Page 110.

41. Multiplier Print Lever [543, Page 110] and Retainer. Unhook Springs [544 & 545] - Page 110 - and pull out shaft [447] - Page 110, to make Multiplier Print Lever free from Cam and Minus Key Lever.

42. Multiplier Setting Bridge [542, Page 110].

43. Non Print Claw [537] Retainer [538] and Blocking Impulse Lever [536] - Page 110.

44. Restoring Lever [540] and Retainer [541] - Page 110.

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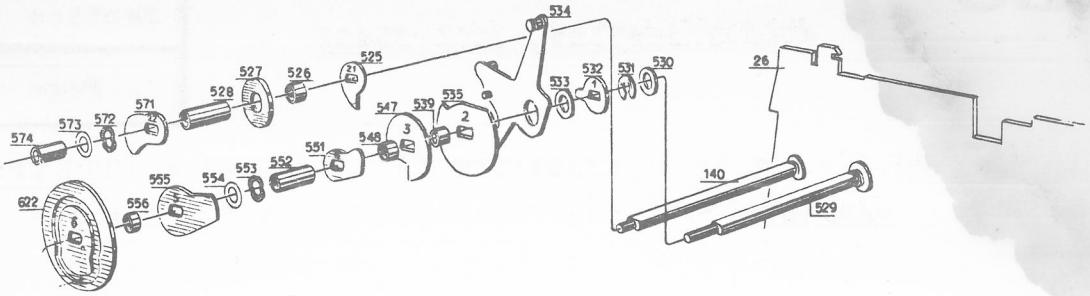

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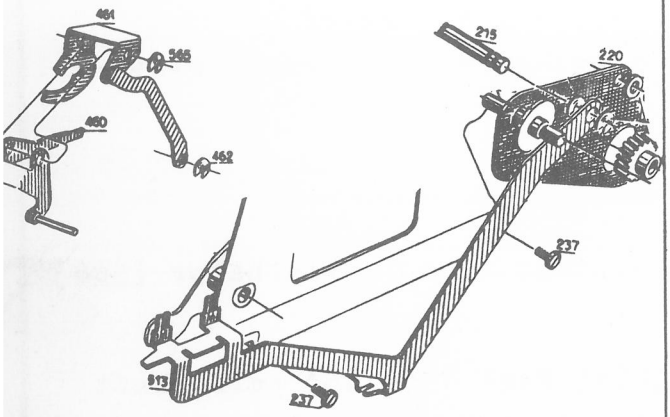

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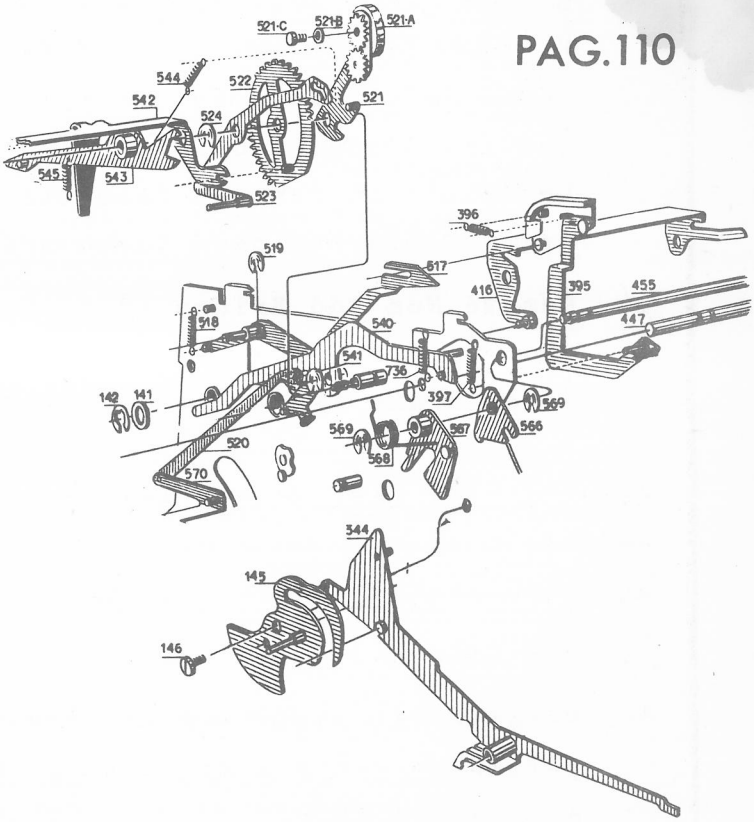

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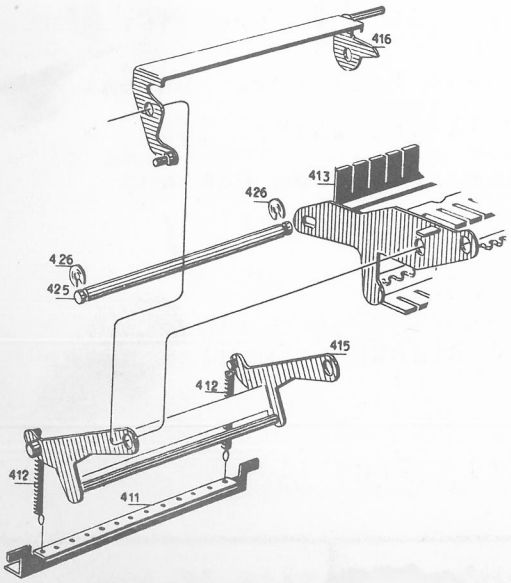

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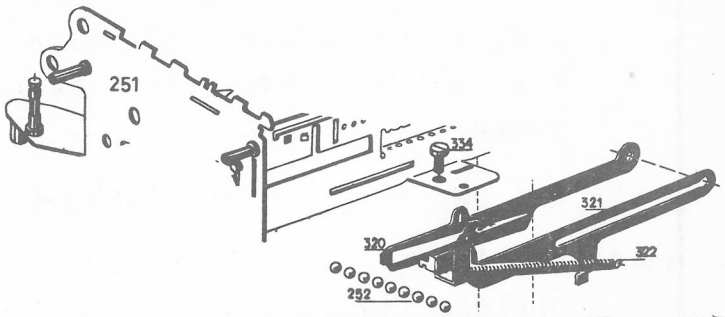

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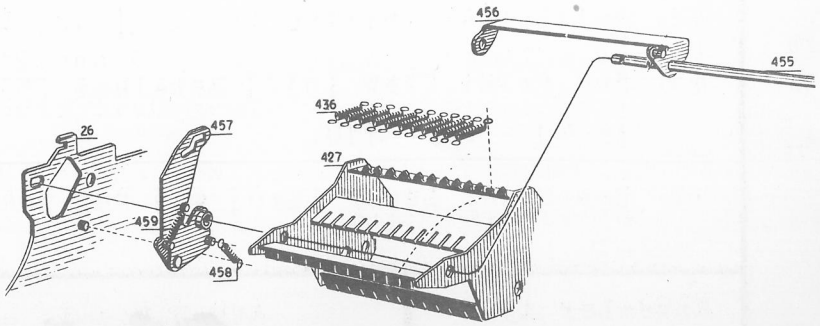

45. Cams and Washers [556, 555, 554, 553, 552, 551, 548, 547, 539, 535, 574, 573, 572, 571, 528, 527 and 526] - Page 109.

46. Ribbon Feed Lever [534, Page 109].

47. Washer [533], Fixing Cam [532], One-Turn Shaft [529], Washer [53o] and Feed Cam [525] - Page 109.

48. Bichrome Lever [523] and Retainer [524] - Page 110.

49. Push Shaft [447, Page 110] enough rightwards to make the Multiplier Segment free. Remove Multiplier Segment [522] and Mult. Head [521] - Page 110.

50. Aligning Lever [517], Spring [518] and Retainer [519] - Page 110. Push Symbol Head [395, Page 110] backwards-upwards, and pull out the Aligning Lever.

51. Non Add Connecting Link [520, Page 110].

Printing Unit and Grand Total Unit

Remove:

52. Springs [412] from Print Fixing Bridge [415] - Page 106.

53. Retainer on the right end of the shaft [425, Page 106] and pull out the shaft.

54. All retainers on shaft [215], Starting Lever [513] - Page 113. Push shaft [215] rightwards so that the Feeler Assembly becomes free and can be removed.

55. Pull out shaft [455] and lift off Total Locking Bridge [456] - Page 107.

56. Pull shaft [447, Page 110] rightwards so far that the G.T. Unit can be lifted off.

57. Decimal Release Cam [457] and unhook Spring [458] from Side Frame - Page 107.

58. Operating Lever [460] - Page 113.

59. Pull Shafts [447, Page 110 and 215, Page 113] so far rightwards that the Printing Unit becomes free.

60. Disconnect Trap Door Release [320, Page 105] from Release Operating Lever [344, Page 110] using a screwdriver.

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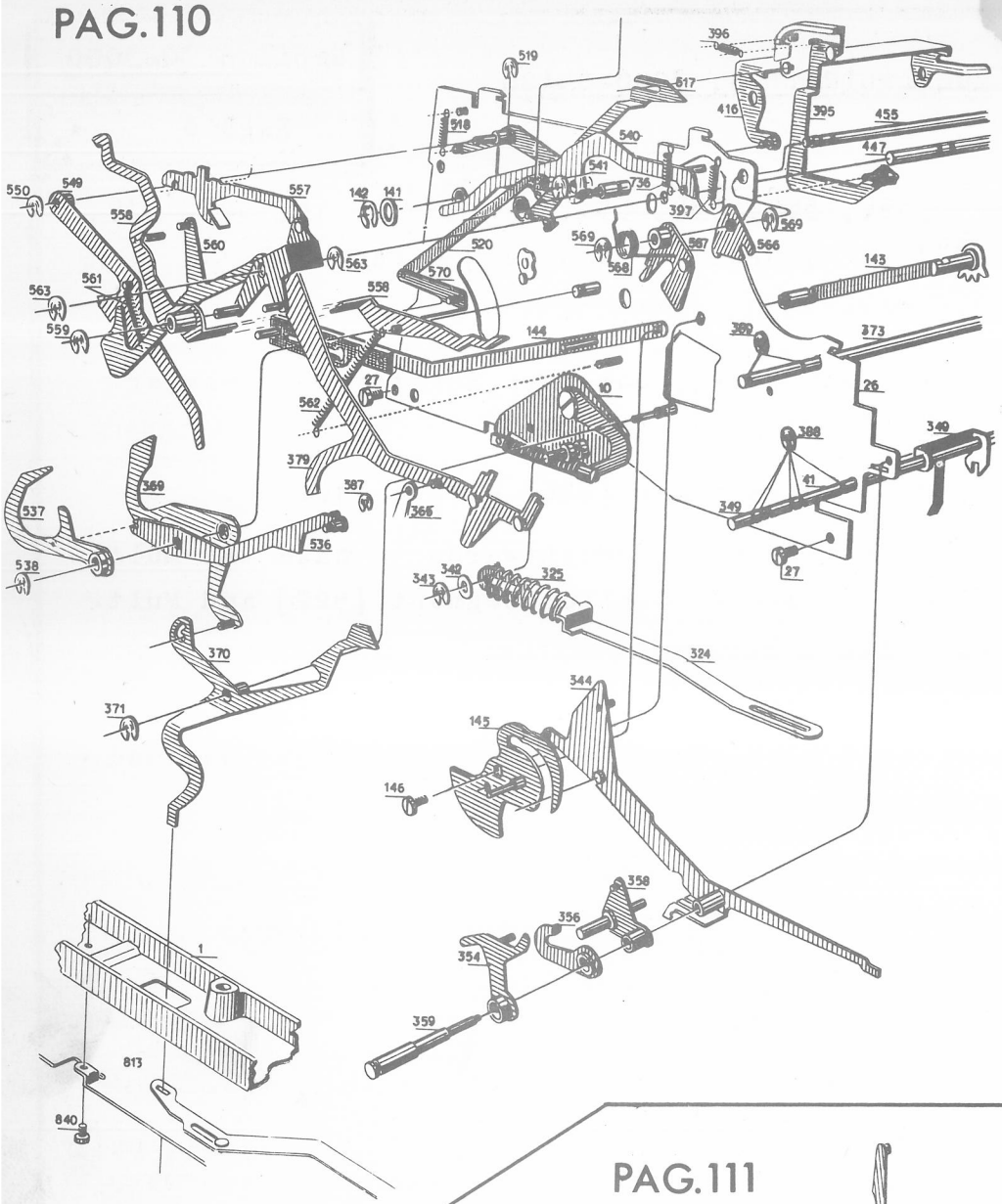

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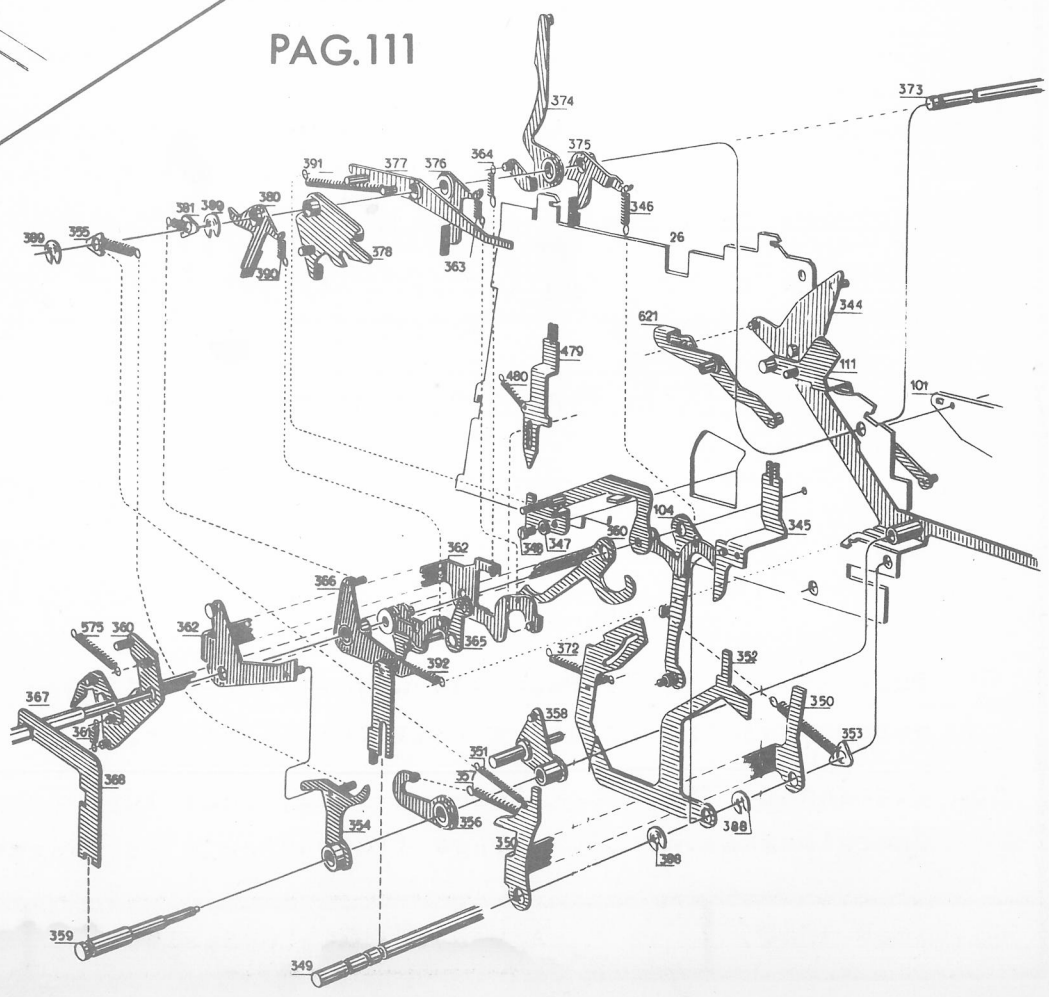

Start machine and turn manually until the type bars have reached their highest position. Now lift the Printing Unit to remove the Symbol Head [395, Page 110]. Then lift out the Printing Unit.

61. Connect Release Operating Lever to Trap Door Release again.

Subtraction Assembly

Remove:

62. Key Tops and Key Stem Guide.
63. Retainers on shaft [373, Page 111] and withdraw shaft rightwards.
64. Key Stem Stop [380] after unhooking spring [390] - Page 111. [Springs 355 & 381, Page 111 can be left on their parts.]
65. Subtraction Starting Lever [379] and Retainer [387], Page 110.
66. Release Link [378], Fifth Link [377] and Spring [391], Page 111.
67. Key Stem Stop [376] and Spring [363] - Page 111.
68. Sign Eliminating Lever [374] and Spring [364] - Page 111.
69. Key Stem Stop [375] and Spring [346] - Page 111.
70. Paper Feed Disengaging Lever [111], if necessary. Re-insert Shaft [373] - Page 111.
71. Locking Plate [368] and Shaft [367] - Page 111.
72. Lift off Repeat Stem [366], Repeat/Starting Cam [365], Start Release Bridge [362] - Page 111. [Note that the Repeat/Subtraction Key [479] is fulcrumed on Start Release Bridge [362] - Page 111.] Then remove Start Keeping Bridge [360, Page 111].
73. Pull out Shaft [359], unhook Spring [357], Remove Detent [354], Full Stroke Lever [356] and Starting Bridge Actuator [358], - Page 111.
74. Remove Retainers on Shaft [349] and pull shaft sufficiently rightwards to clear Plus/Minus Lever [352] and Bridge [350] - Page 111. Then remove these parts with "Double Spring" [351] - Page 111.
75. Cut Out Lever [370], Retainer [371] and Non Print Bell Crank [369] - Page 110.

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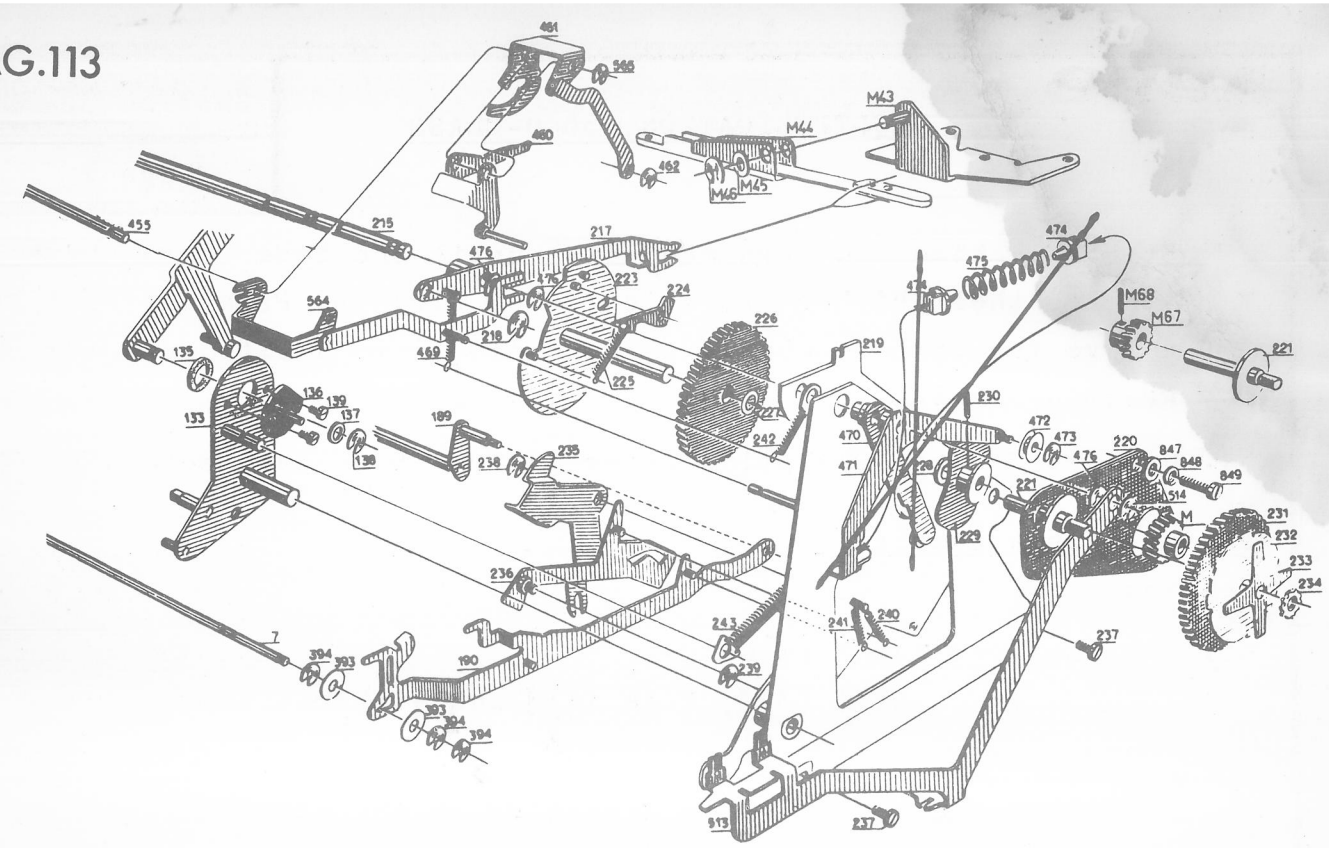

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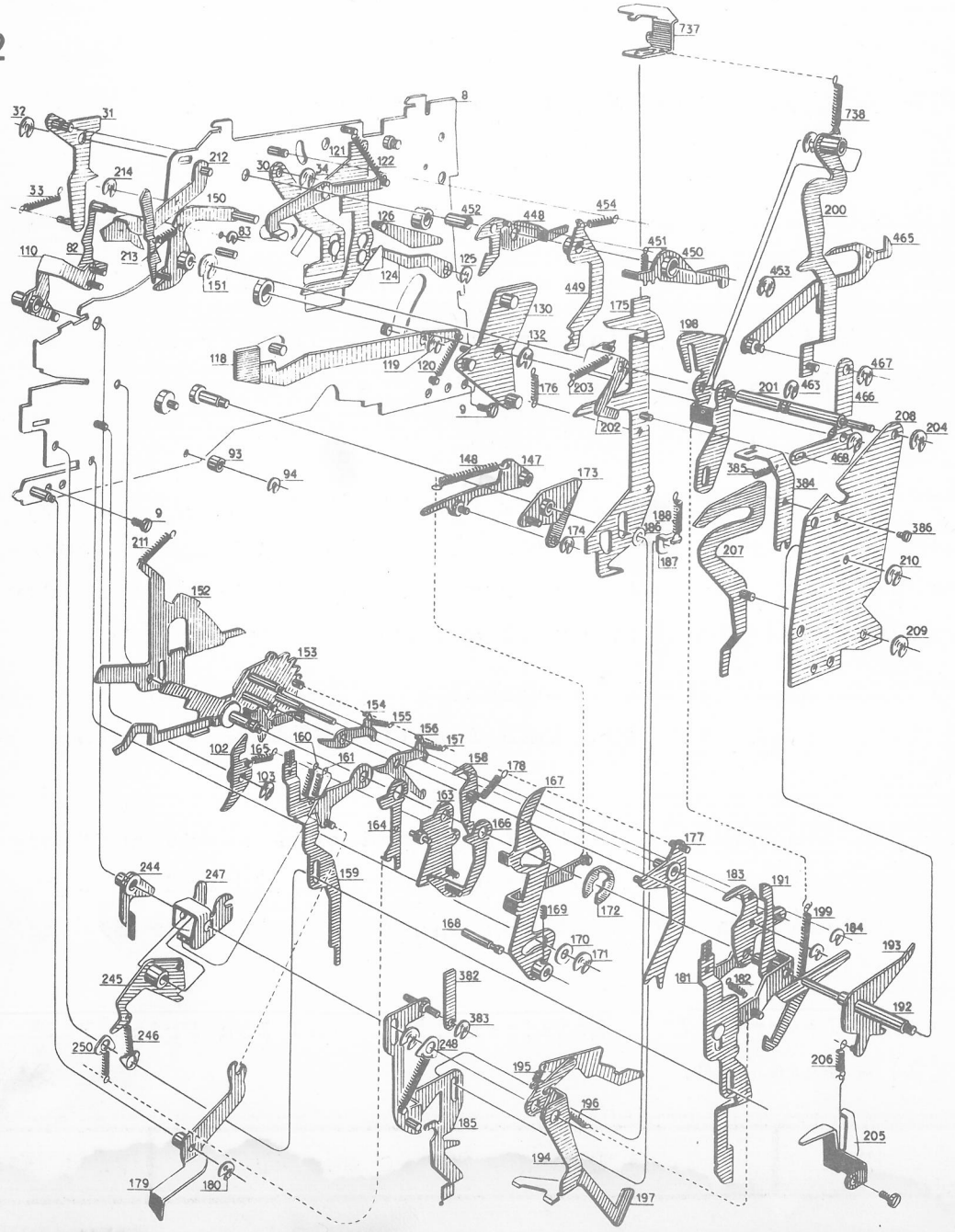

76. Loosen Release Cam Fixing Screw [146] if Release Operating Lever [344] - Page 110 - has to be removed.

Bearing Plate [219] and Crossing Stroke Lever [190] - Page 113

Remove:

77. If Top Plate has not been removed, which is not necessary, remove the Clamp holding Bearing Plate [219, Page 113].

78. Retainers on Shaft [215, Page 113] and pull the shaft leftwards to clear the Bearing Plate.

79. Inner- and Outer Rocker Arms [470 & 471] with Spring [475] - Page 113 -. Refer to Section 32M-3000, Page 6, point 23.

80. Detach Springs [240 & 241, Page 113].

81. Retainers [238 & 239] and Springs [243 & 469] - Page 113.

82. Screw [849], Lockwasher [848] and Washer [847] - Page 113.

83. Screws [237, Page 113].

84. The Bearing Plate can now be removed. Use a screwdriver to clear the Driver [235] and Positioning Lever [236] - Page 113.

85. Guide [384], Springs [203 & 385] and Screw [386] - Page 112.

86. Retainers to make free the Support Plate [208], loosen Guide [205] and detach Spring [206], Page 112.

87. Support Plate [208] with Total Starting Lever [207] - Page 112.

88. Detach Spring [199] and loosen Shaft [201] - Page 112. The Shaft and the parts on the shaft may be removed as a unit.

89. Add. Bar Retainer [193] - Page 112.

90. Lift the front of the machine and detach through the underside two Retainers [one on each side of the Crossing Stroke Lever [190] - Page 113].

91. Pull Locating Shaft leftwards [7, Page 113] until the Crossing Stroke Lever becomes free. Note that there are two washers. Remove carefully the Crossing Stroke Lever. Do not use force in its removal.

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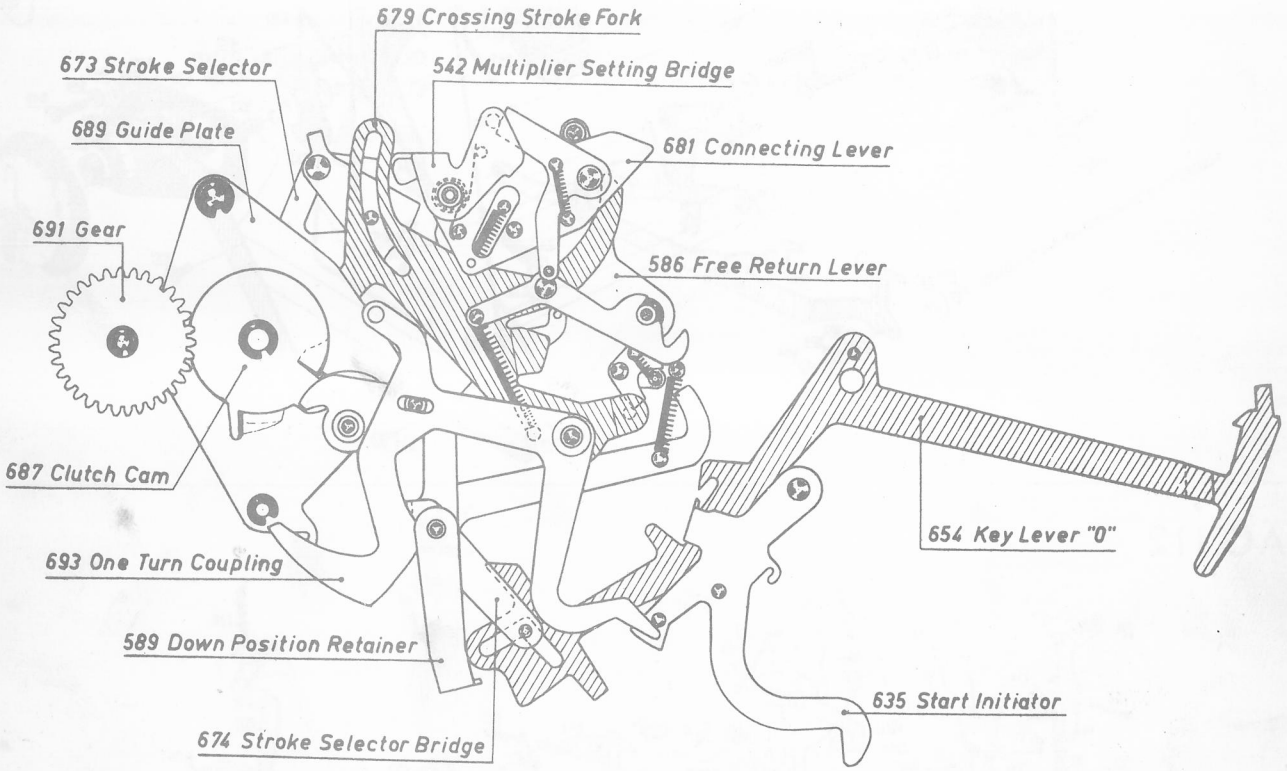
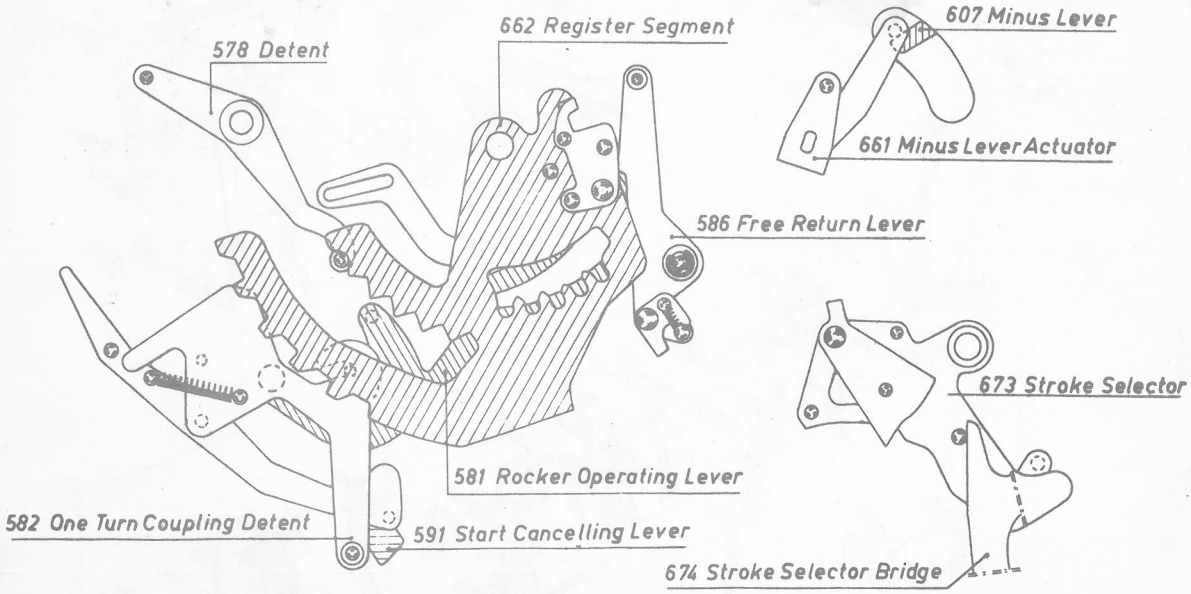
MULTIPLICATION, 3000-CLASS





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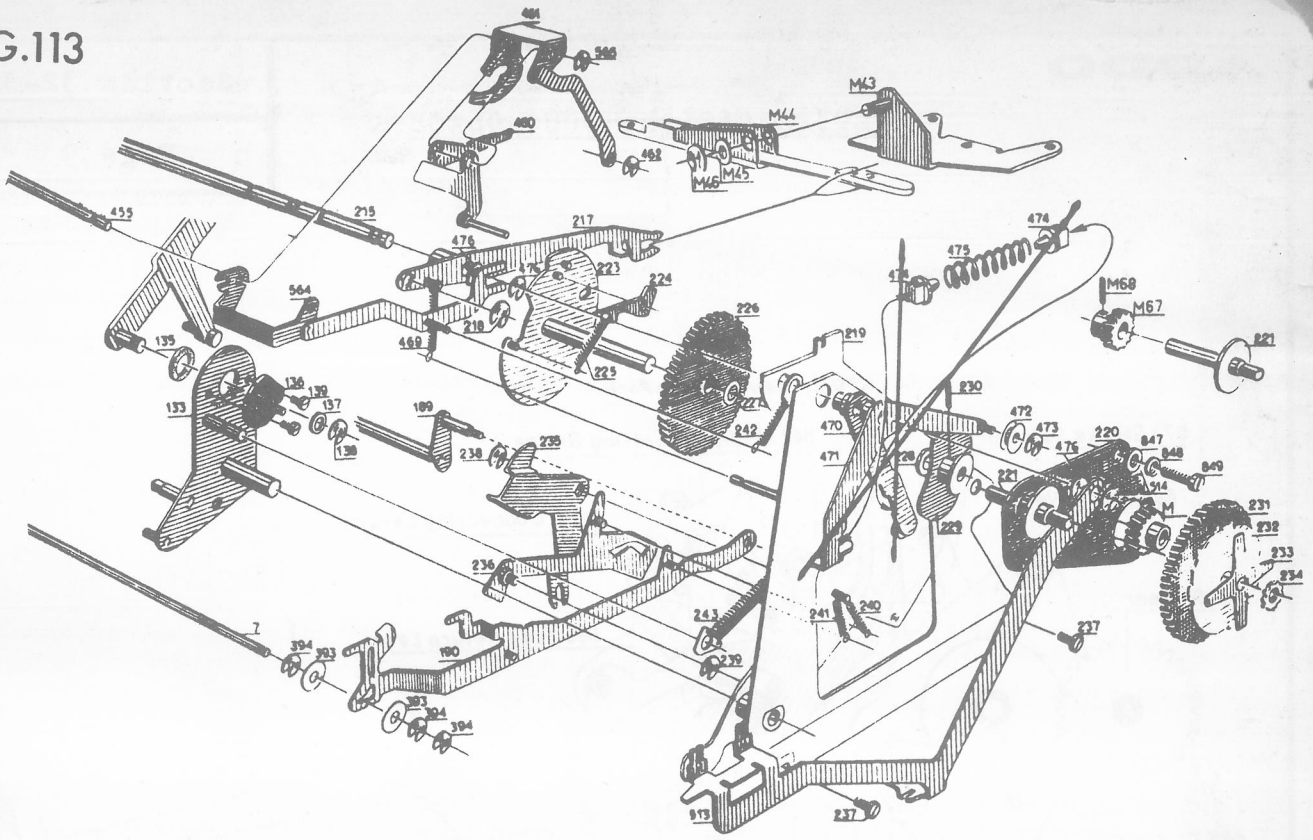

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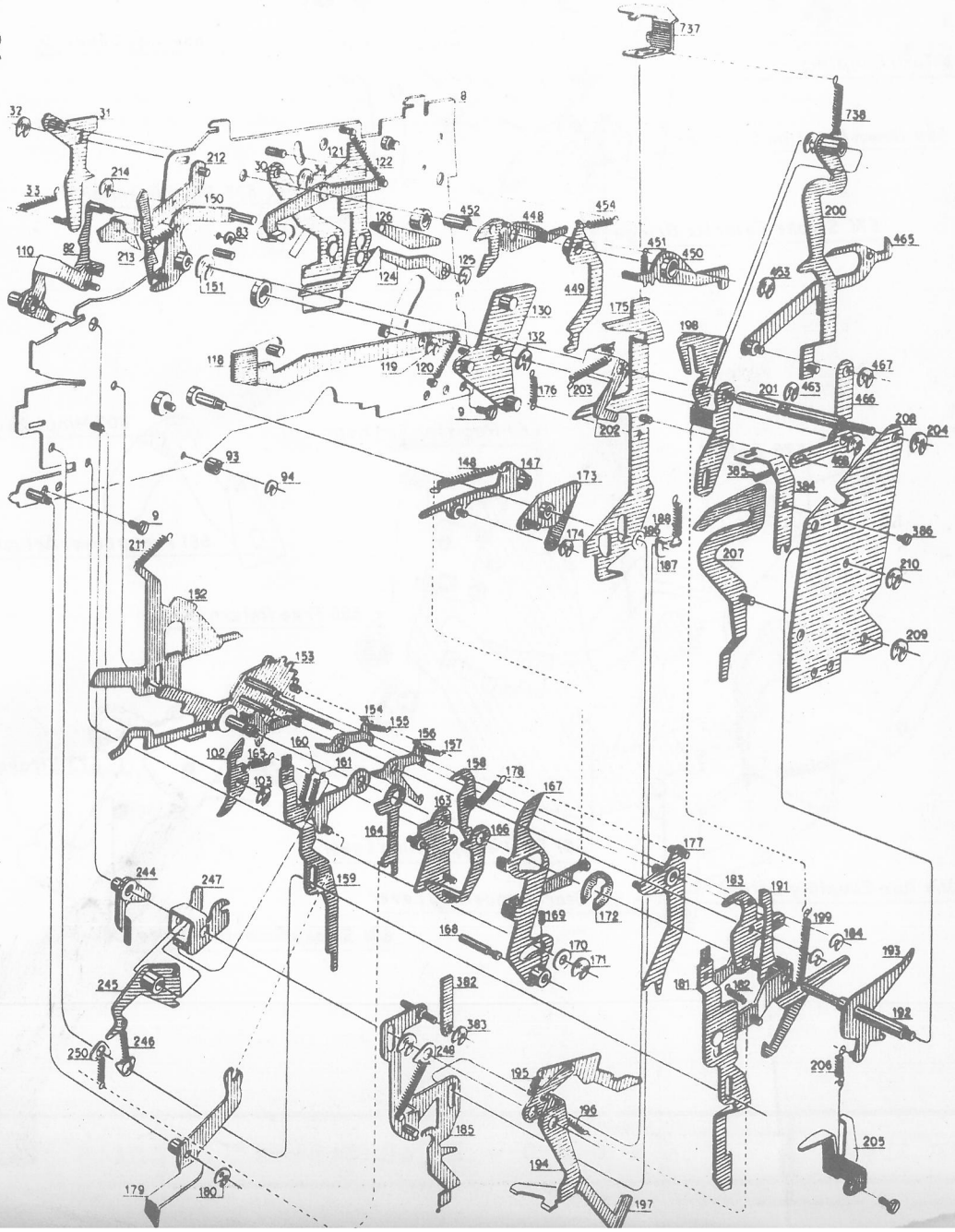

REASSEMBLING ADDO-X 3000

Crossing Stroke Lever and Bearing Plate

92. Replace the Crossing Stroke Lever [190, Page 113]. Also check location per Fig. 21.

93. Push Locating Shaft [7, Page 113] into its right position. Place two Washers [393] and two Retainers [394] - Page 113 - on the Locating Shaft [one on each side of the Crossing Stroke Lever].

94. Secure rear end of the Crossing Stroke Lever on the lower rear shaft [189, Page 113].

95. Replace Add. Bar Retainer [193]. See Sect. 32M-3000, Page 6.

96. Install Shaft [201] toghether with parts [202, 198 and 200] and attach spring [199] - Page 112.

97. Place Total Starting Lever [207] on Support Plate [208] and secure with retainer [209] - Page 112.

98. Replace Support Plate and Guide [205] - Page 112 - at the same time. Make sure that the Guide is placed vertically to get the right tension on spring [206, Page 112].

99. Secure Support Plate with retainers and put shafts in place if Subtraction Assembly has not been removed. Otherwise pull shafts rightwards.

100. Secure Guide [384] by means of screw [386] and attach springs [203 & 385] - Page 112.

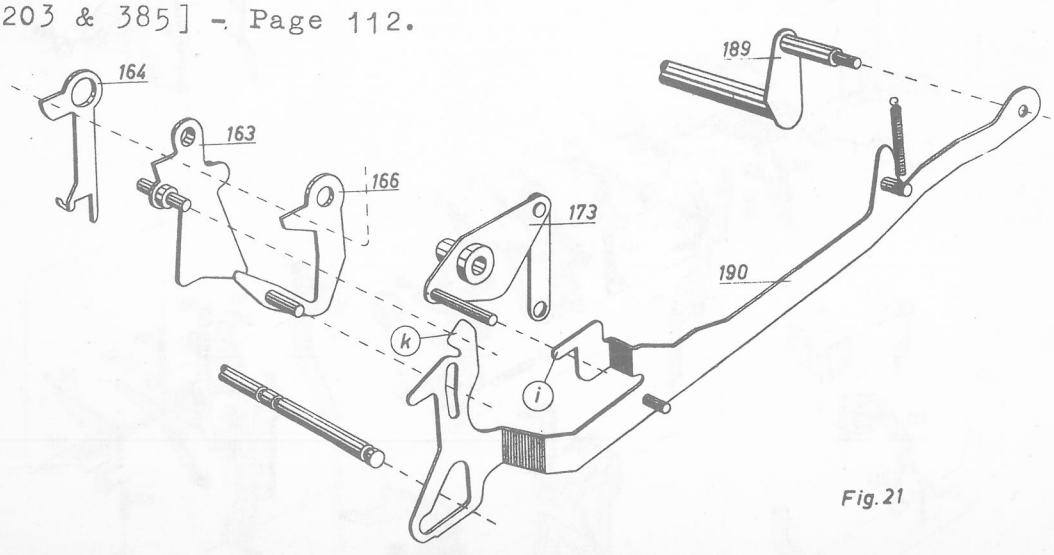

Fig. 21

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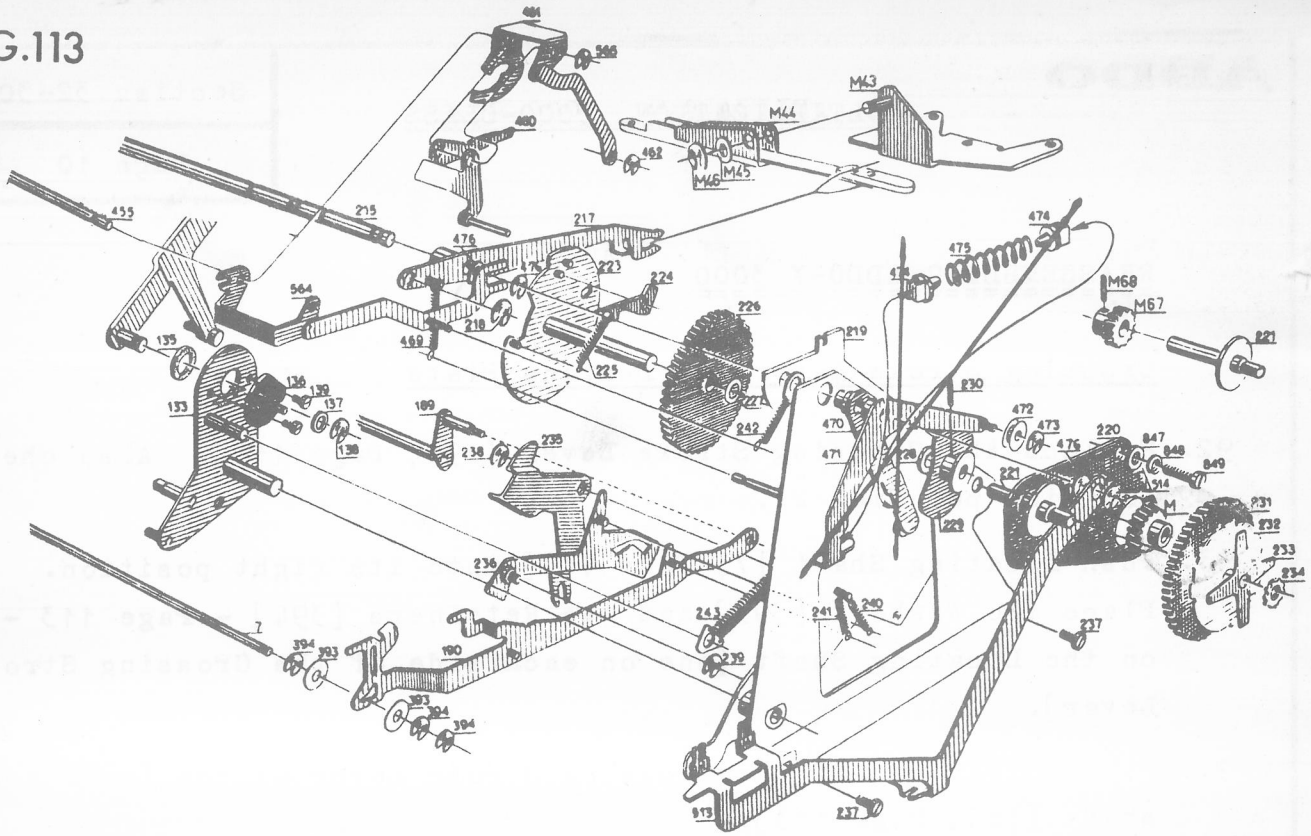

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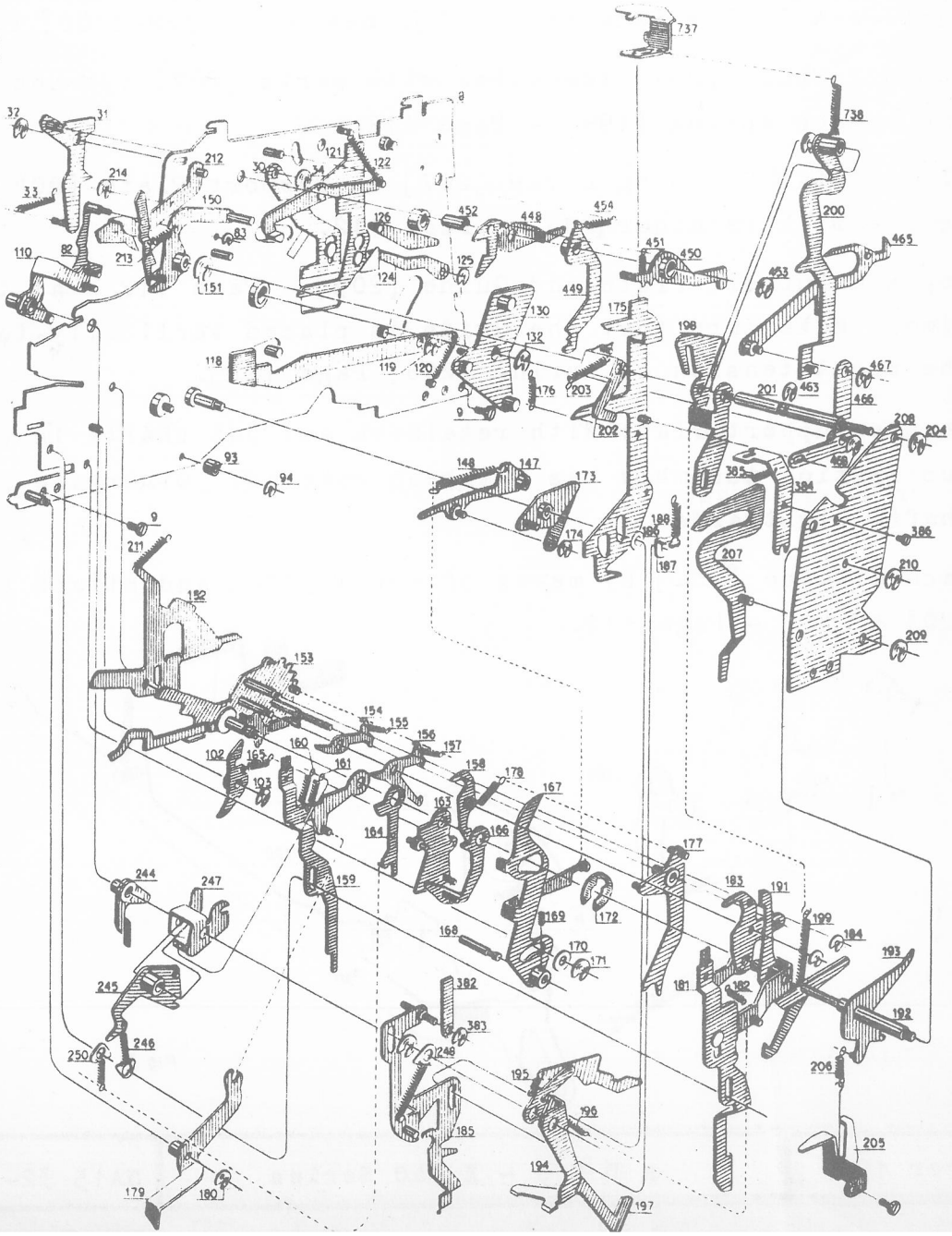
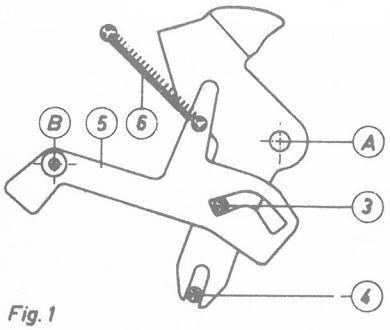


101. Push shaft [215, Page 113] sufficiently leftwards to avoid interference when installing Bearing Plate.

102. Place the Bearing Plate so far in that the Main Shaft comes into its bearing. Install Positioning Lever [236] and Driver [235] - Page 113 - on theirs studs on the Bearing Plate seeing that the Positioning Lever comes on the inside of the base plate ridge. Insert Bearing Plate fully making sure that the stud [X] comes into the hole [Y] - see Fig. below -.



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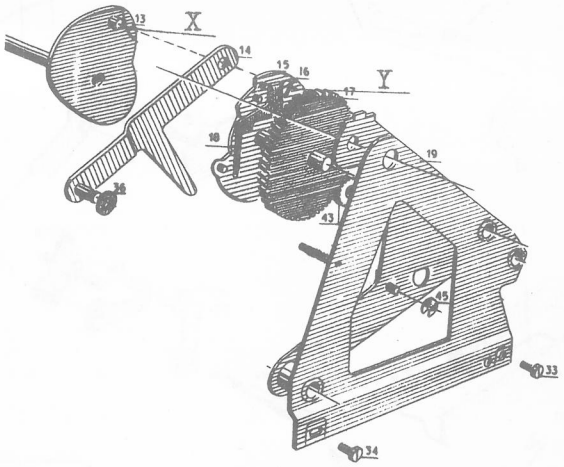

103. Secure the Bearing Plate with Screws [33 & 34, Fig. above].

104. Install Insulating Plate Binding Screw [849] with Washers [847 & 848] - Page 113.

105. Secure Positioning Lever [236] and Driver [235] with Retainers - Page 113 -.

106. Attach Springs [240 & 241, Page 113]. Note that the stronger spring [6, Fig. 1 above] is attached to the spring post of the positioning lever, outside of the plastic collar.

107. Attach Springs [469 & 243, Page 113].

108. If the Printing Unit Assembly has not been removed, push Shaft [215, Page 113] in place. Note that the Spring [242] is installed on the shaft [Refer to Spare Parts Catalogue, Page 113].

109. Replace Retainers on Shaft [215, Page 113].

110. Replace Starting Lever and Top Plate Clamp.

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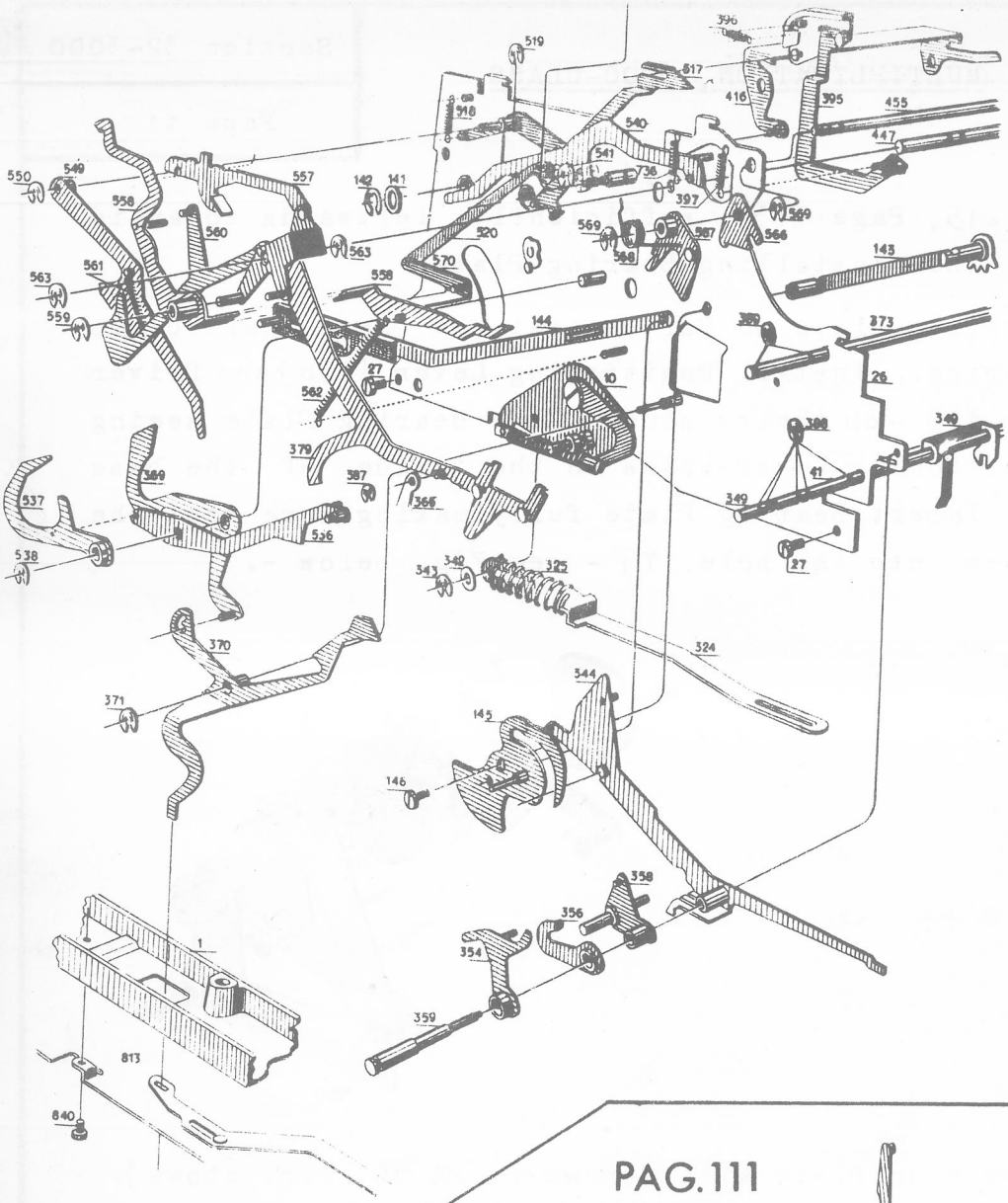
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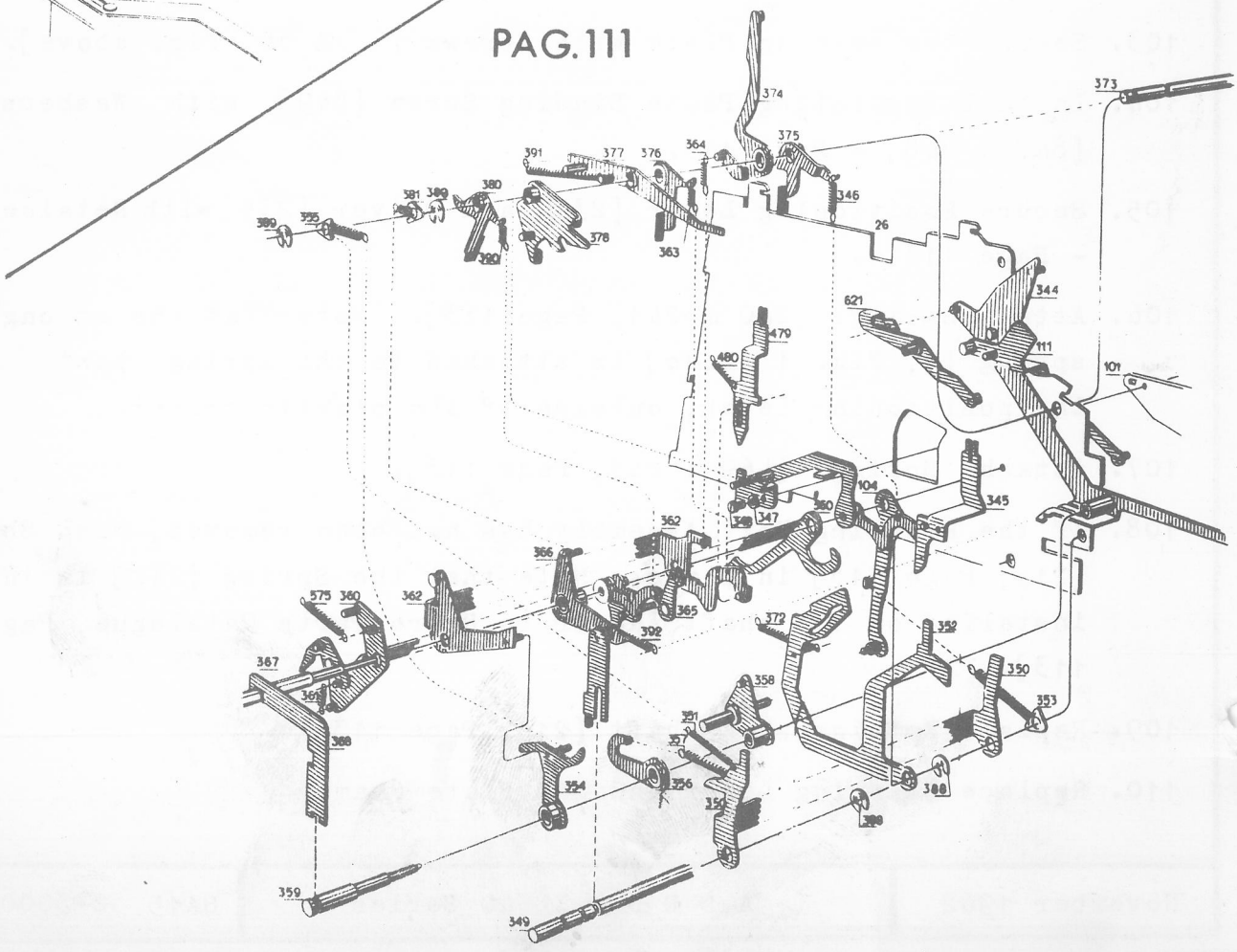
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Subtraction Assembly

111. Replace Release Operating Lever [344] and secure Release Cam [145] with Release Cam Fixing Screw [146] making sure that the stud of the Governor Link is placed in the hole of the Release Cam [Refer to Page 110 of the Spare Parts Catalogue].

112. Install Non Print Bell Crank [369], Cut Out Lever [370] and Retainer [371] - Page 110.

113. Replace Plus/Minus Lever [352] together with the Bridge [350] and push the Shaft [349] in place - Page 111 -. Secure with retainers. Be sure to place the Spring [353] into the inner groove of the shaft [349]. Check location of the parts per Page 111 of the Spare Parts Catalogue.

114. Connect Spring [372, Page 111] from the Plus/Minus Lever to the stud of the Side Frame.

115. Install the Starting Bridge Actuator [358] seeing that the longer stud comes between the Plus/Minus Lever [352] and the Bridge [350]. It may be expedient to keep the Bridge [350] to the left during this installation. Make sure that the stud of Subtraction Starting Link comes into the tubular stud of the Starting Bridge Actuator [358]. Refer to Page 111 of the Spare Parts Catalogue.

116. Place the Full Stroke Lever* [356] beside the Starting Bridge Actuator and under its longer stud but to the left of the Bridge [350] - Page 111 -

117. Replace the Detent [354] so that its extension comes over the stud of the Starting Bridge Actuator - Page 111 -

118. Push in Shaft [359] and connect Spring [357] - Page 111 -

119. Replace the Repeat Stem [366] and lift the Detent [354] so that it comes in front of the Repeat Stem - Page 111 -

120. Place Start Keeping Bridge [360, Page 111] in an approximate position.

*Not used in machines manufactured after November 1960.

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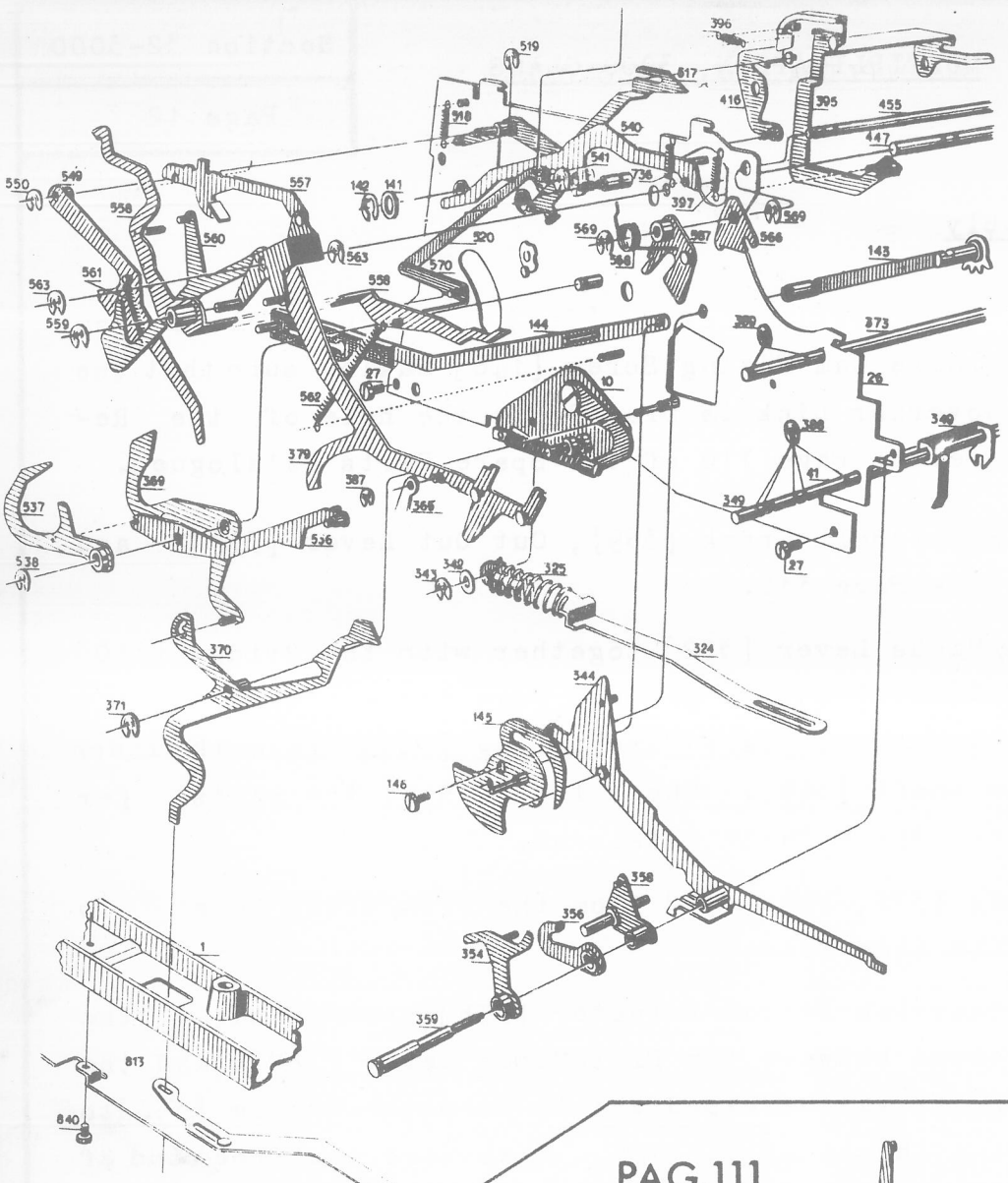
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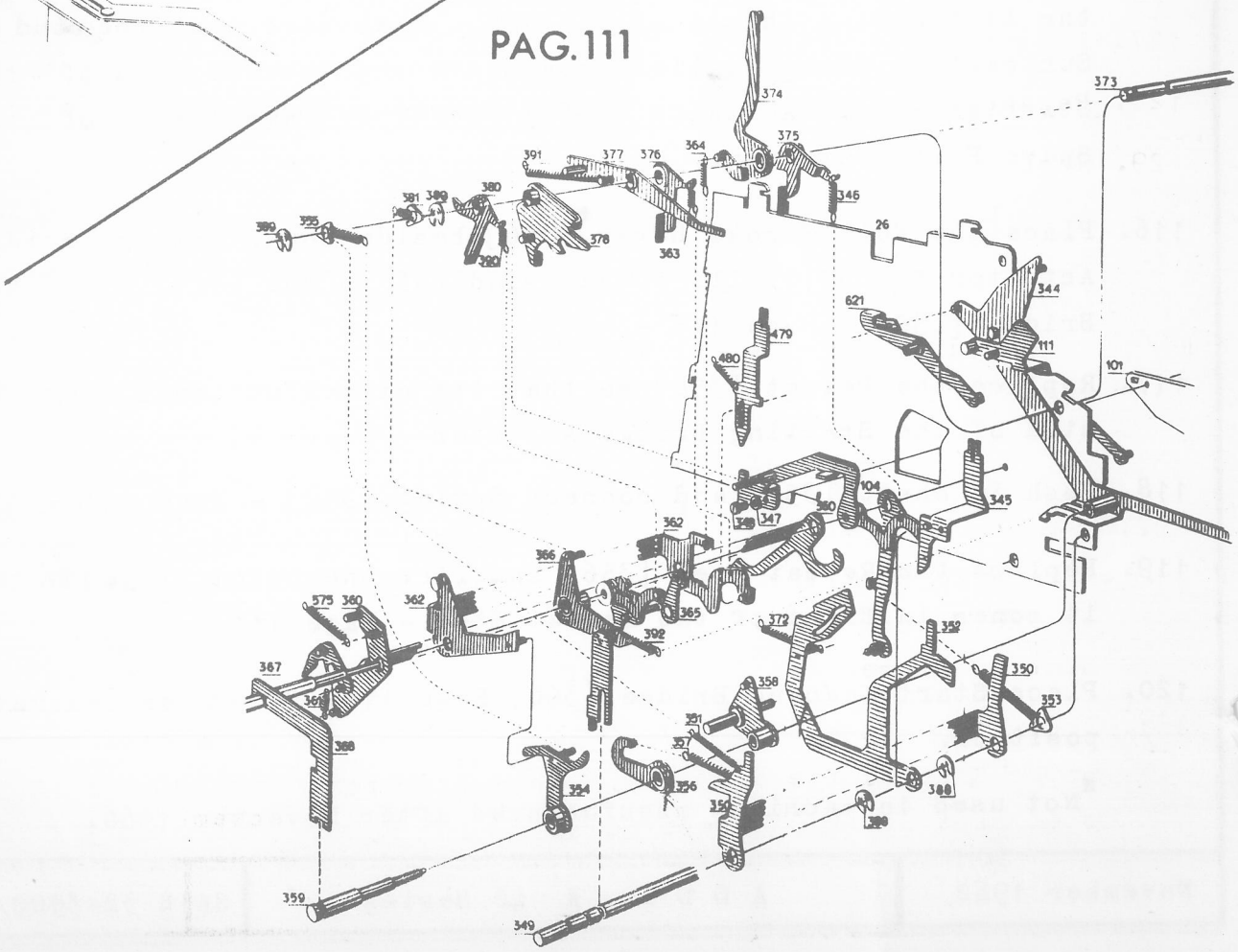
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121. Place the Repeat Starting Cam [365] in the right hole of the Start Release Bridge [362] seeing that the right stud of the Repeat Starting Cam comes under the Right End of the Start Release Bridge and the link of the Repeat Starting Cam over its left stud. Then position the assembled parts between the Start Keeping Bridge Ends [360] and insert Shaft [367]. Check correct location of the parts per Page 111 of Parts Catalogue.

122. Replace Locking Plate [368, Page 111].

123. Connect Spring [392] between Repeat Starting Cam [365] and Release Operating Lever [344] - Page 111 -

124. Facing the front of the machine check that the Detent [354] is placed behind the Bridge [350] and over the stud of the Start Release Bridge [362]. The link of the Repeat Starting Cam must be positioned to the right of the Plus/Minus lever [352] - Page 111 -

125. Connect Spring [355] to the stud of the Detent [354]-Page 111 -

126. Position the Repeat Subtraction Key [479] on the Right End Stud of the Start Release Bridge [362] - Page 111 -

127. Install Paper Feed Disengaging Lever [111, Page 111].

128. Replace Key Stem Stop [375] with Spring [346] - Page 111 -

129. Replace Sign Eliminating Lever [374, Page 111]. When installing this part keep it close to the Side Frame and guide it rearwards in between the Side Frame and Paper Feed Disengaging Lever [111] - Page 111 -. The Shaft [373, Page 111] must be inserted flush with the Key Stem Stop during this installation.

130. Connect Spring [364, Page 111].

131. Install Key Stem Stop [376] with Spring [363] - Page 111 -

132. Replace Fifth Link [377] with Spring [391] - Page 111 - .Make sure that the Fifth Link engage in the hole of the link on the Sector Stopping Arm Latch [314, Page 105]. The Fifth Link is placed to the left of the Repeat Subtraction Key.

133. Install Release Link [378] - Page 111 -. Be sure that the upper stud of the Starting Bridge Actuator [358] engage in the open slot of the Release Link.

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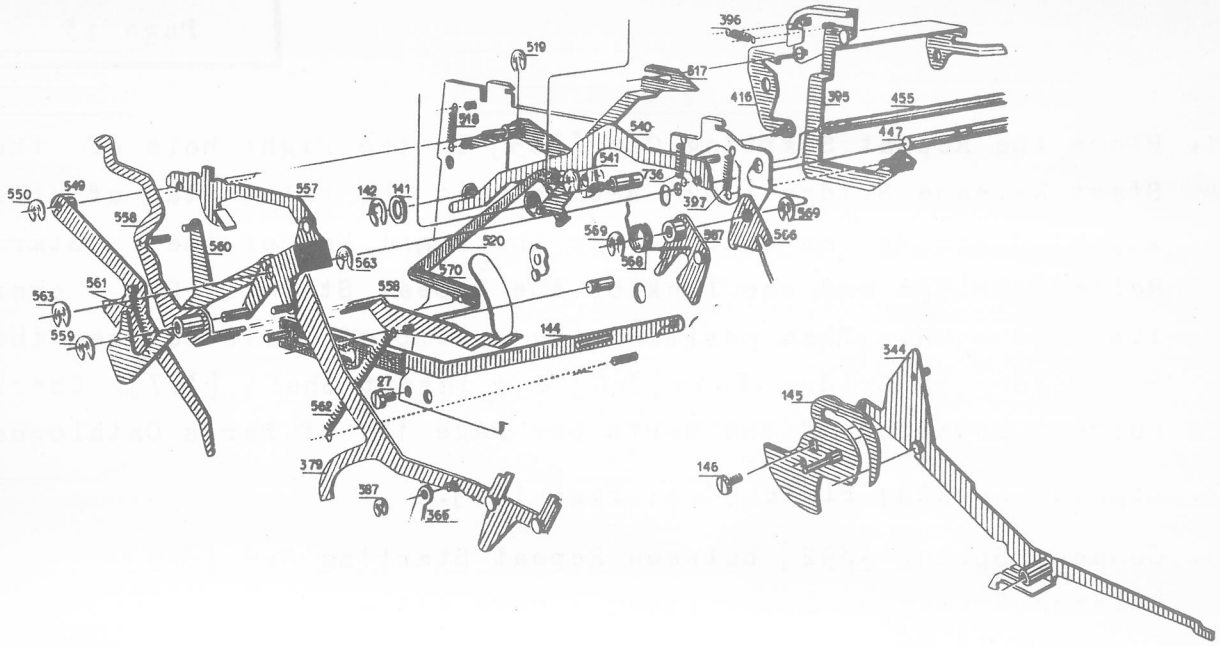
PAG.110



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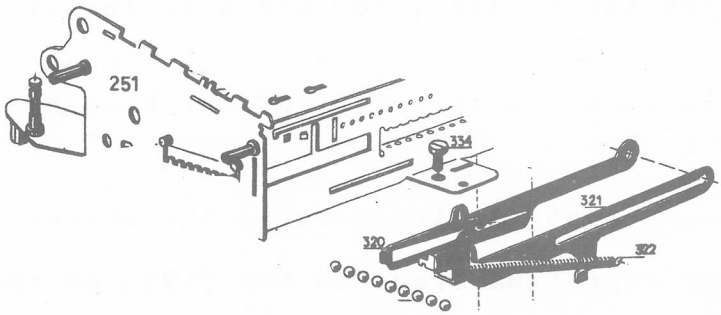

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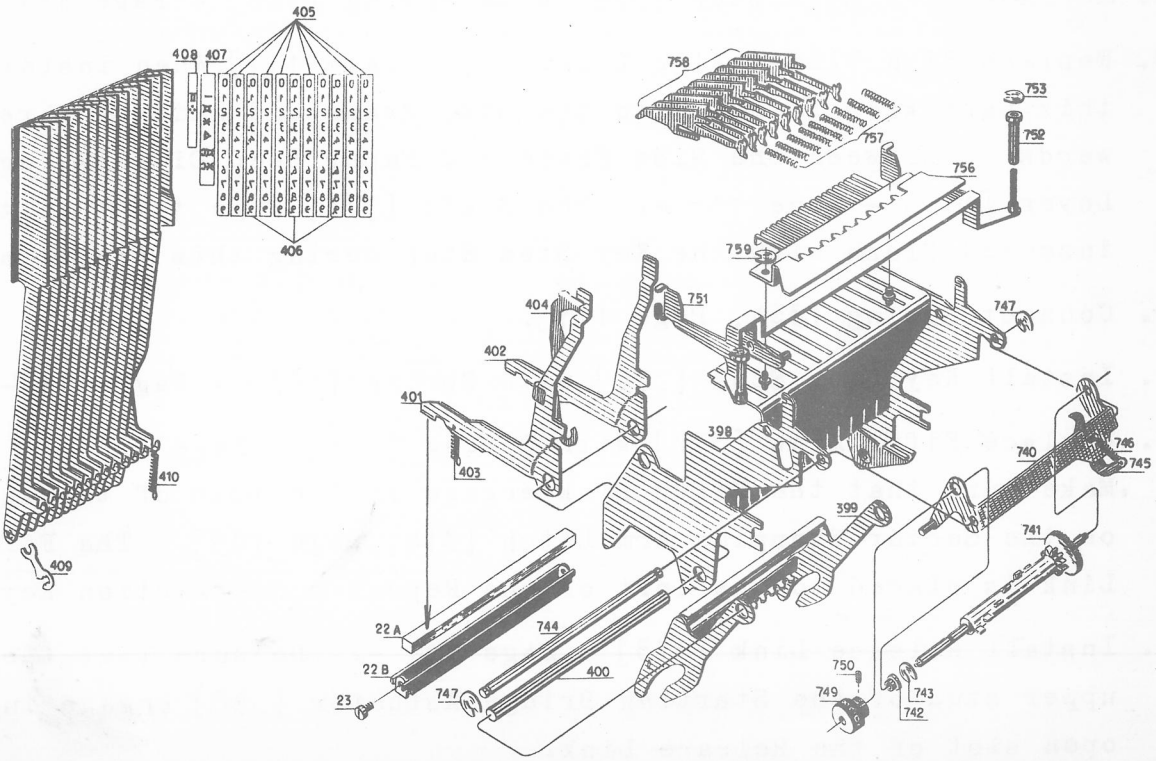

134. Make sure that the spring post of the Fifth Link [377] rests on the shoulder of the Release Link [378] - Page 111. Replace Subtraction Starting Lever [379], connect the link of the Repeat Starting Cam [365] to the stud of the Subtraction Starting Lever and secure with retainer [387] - Page 110.

135. Install Key Stem Stop [380] and attach spring [390] - Page 111.

136. Connect Springs [355 & 381] to the Shaft [373], pushing it in place at the same time - Page 111. Attach all retainers on the Left as well as on the Right Hand Side.

137. Now replace the Key Stem Guide [490, Page 104]. Do not connect Spring [480, Page 111] at this time but be sure that it is accessible so that you can easily connect it to the Key Stem Guide later.

Printing Unit and Grand Total Unit

138. Disconnect Trap Door Release [320, Page 105] from Release Operating Lever [344, Page 110] using a screwdriver. Start machine and turn manually until the type bars have reached their highest position. Push Shafts [447, Page 110, and 215, Page 113] sufficiently rightwards to avoid interference during installation.

139. Install Printing Unit seeing that the type bars come between the hammers, and the type bar studs come over the hammers. Position the stud of the Symbol Head [395, Page 110] into the aperture of the side frame and locate Symbol Head on its pivot stud on Printing Unit Frame. Then put the Printing Unit in place.

140. Push in Shaft [215, Page 113] but only so far that it comes through the right end of the printing unit frame and supports it during installation. The Feeler Assembly is mounted on this shaft later.

141. Run the machine manually to get down the type bars to their initial position and connect Release Operating Lever to the Trap Door Release [320, Page 105] again.

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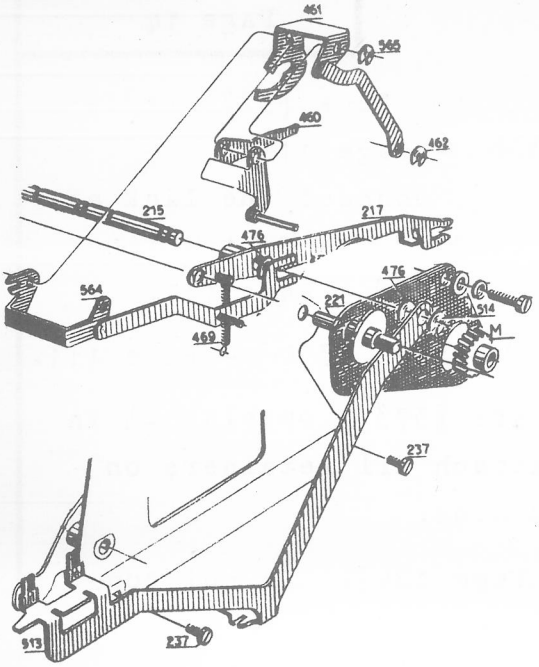
PAG.113



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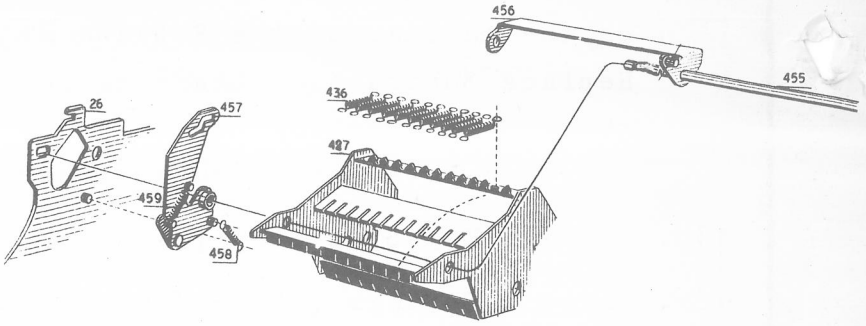

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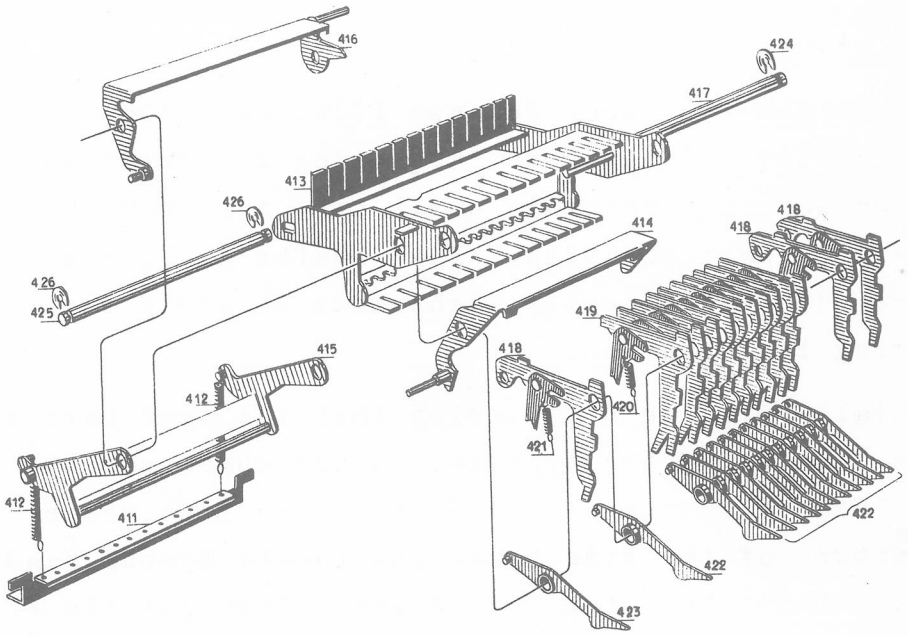

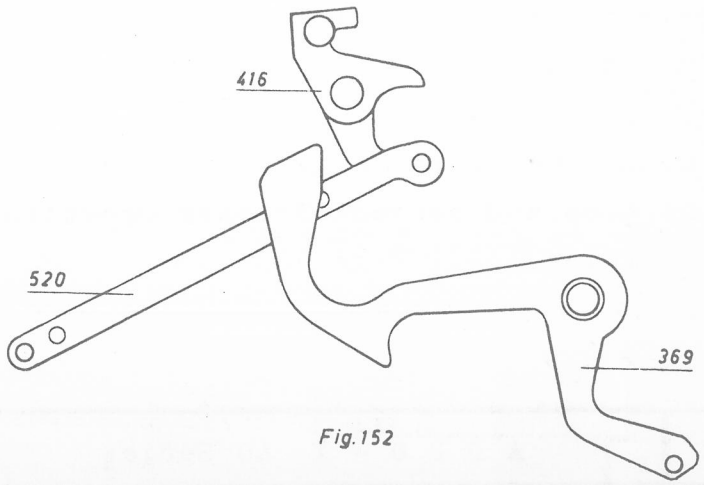

Fig. 152

142. Swing the G.T. Unit Cam [461, Page 113] half a turn so that its open end points upwards. Replace G.T. Unit and swing back the G.T. Unit Cam over the G.T. Unit Roll.

143. Insert Shaft [447, Page 110]. Check that the parts on the right end of the shaft are in their right position.

144. Replace Total Locking Bridge [456, Page 107] seeing that its stud comes into the notch of the Total Locking Lever [564, Page 113].

145. Replace Decimal Release Cam [457, Page 107] between the left end of the Total Locking Bridge and the G.T. Unit. Connect Spring [458, Page 107] to the stud on the Side Frame.

146. Replace Operating Lever [460, Page 113] so that its stud comes into the notch of the Rocker [198, Page 112].

147. Insert Shaft [455, Page 107] but not so far that it comes through the right end of the Total Locking Lever [564, page 113]. Otherwise the Total Locking Lever would interfere with Shaft [447, Page 110] when installing the parts on the left hand side frame.

148. Install Feeler Assembly and insert Shaft [215, Page 113]. The Feelers [422, Page 106] are placed under the studs of the Type Bars.

149. Replace all retainers on the shaft and install Starting Lever [513, Page 113].

150. Insert Shaft [425, Page 106] and secure it with its retainers.

151. Connect Springs [412, Page 106] to the Print Firing Bridge [415, Page 106].

Parts on the Left Side Frame

NB.- FROM NOW INSTALL WITH THE MACHINE IN ITS INITIAL POSITION

152. Place the Non Add Connecting Link [520] behind the Non Print Bell Crank [369] - Page 110 - so that it rests on the shoulder of the One-turn Shaft Bearing but under the Camshaft.

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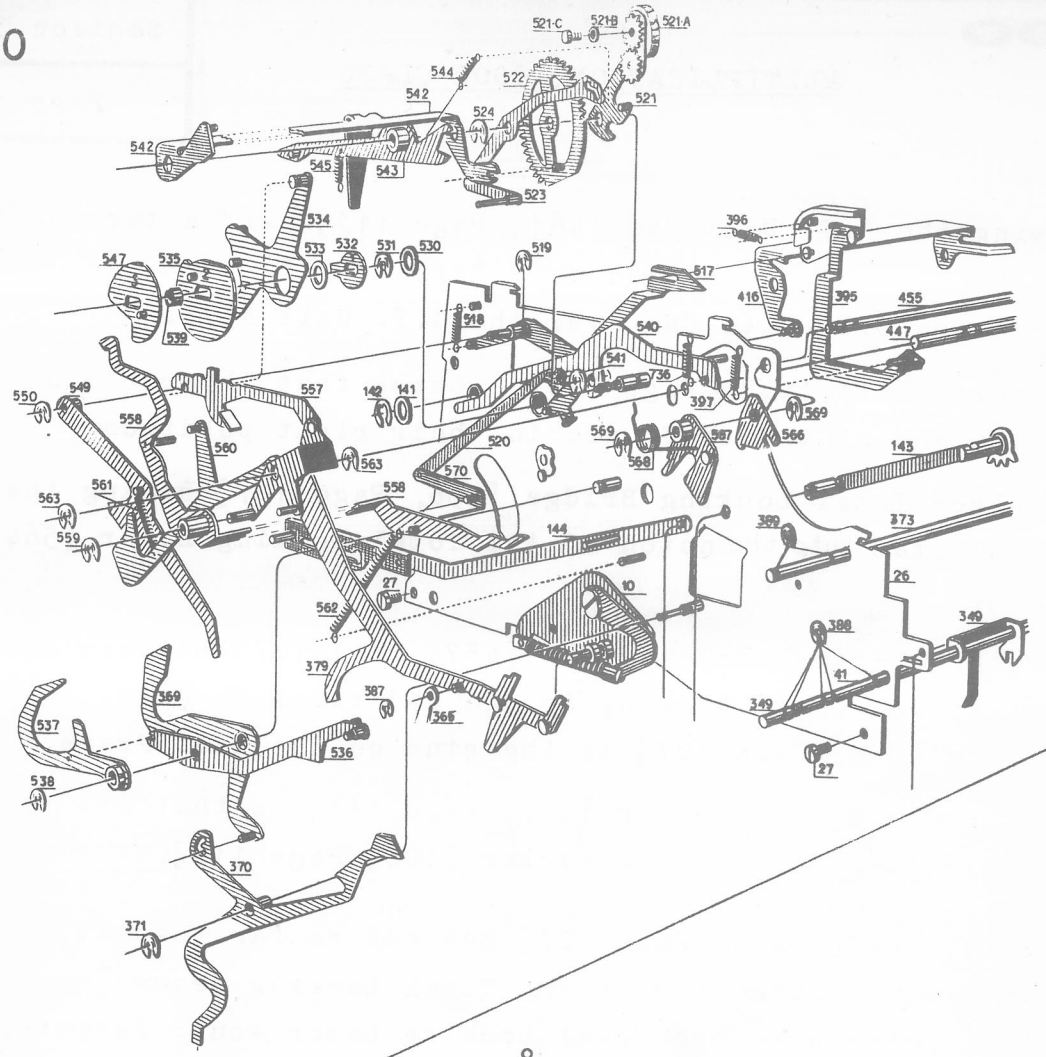
PAG.110



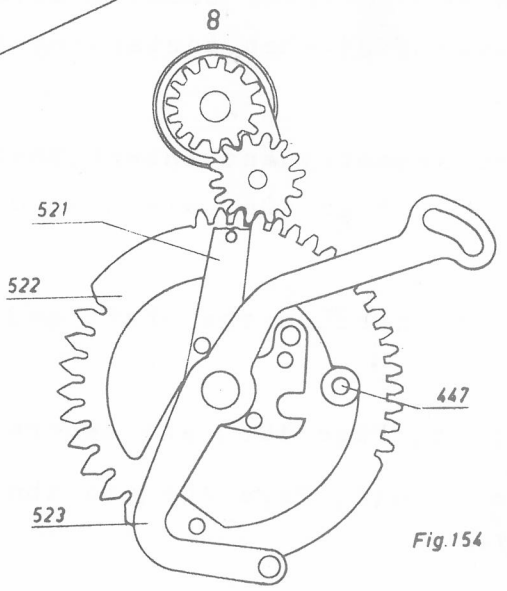
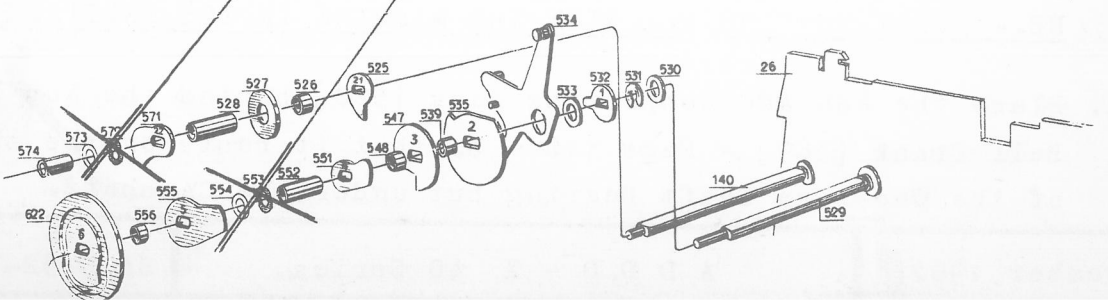


Fig.154

PAG.109

See Section 32M-3000, Page 5



153. Replace Aligning Lever [517, Page 110] and locate Symbol Head Shoulder Stud into the notch of the lever. Secure with Retainer [519] and attach Spring [518] - Page 110.

154. Install the Mult. Head [521] on its pivot and push Shaft [447] sufficiently rightwards to allow installation of the Multiplier Segment [522] - Page 110. Replace Multiplier Segment and turn it in a clockwise direction until its shoulder rests on the Shaft [447]. Now position the Mult. Head [521] vertically seeing that two teeth of the Multiplier Segment are free. In this situation the figure "8" must point upwards as indicated in Fig. 154.

155. Replace Bichrome Lever [523] and secure with Retainer [524] - Page 110.

156. Place Washer [530] and Retainer [531] on the One-turn Shaft [529] - Page 109. Insert the One-turn Shaft into its bearing on the Side Frame.

157. Install the Cam [532], Washer [533] and Cam [525] - Page 109.

158. Install Ribbon Feed Lever [534] on the Washer [533] - Page 109.

159. Replace in order the following parts [526, 527, 528, 571, 572, 573, 574, 535, 539, 547, 548, 551, 552, 554, 553, 555, 556].

160. Install the Restoring Lever [540] & Retainer [541] - Page 110.

161. Replace Blocking Impulse Lever [536] and Non Print Claw [537] - Page 110. Be sure that the stud of the Non Print Claw is placed into the notch of the Blocking Impulse Lever and that the Cam "2" can actuate the Non Print Claw with its stud.

162. Install Multiplier Setting Bridge [542, Page 110] and connect its right end arm to the stud of the Multiplier Segment.

163. Pull Shaft [447] rightwards until the Multiplier Print Lever [543] can be placed behind the Minus Key Lever. The stud on the rear end must rest on the Cam "3" - Page 110.

164. Secure with retainer, and hook Spring [545] to the stud of the side frame. Connect Spring [544] to the Mult. Head [521].

165. Replace the Cut Out Lever Detent [549] so that it rests against the One-turn Shaft, and secure with retainer [550] - Page 110.

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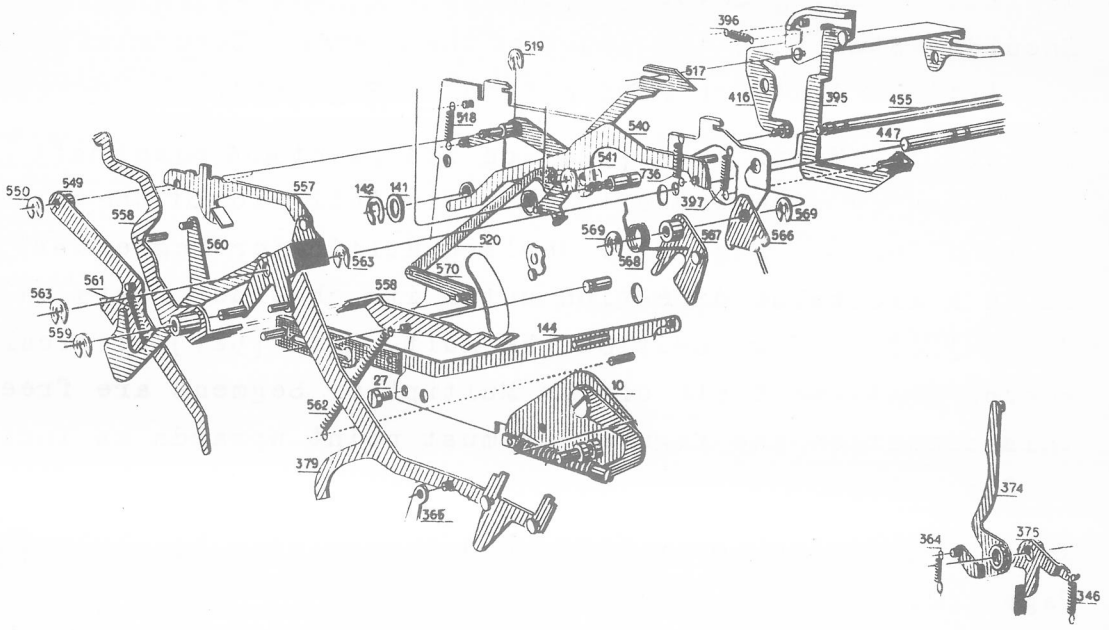
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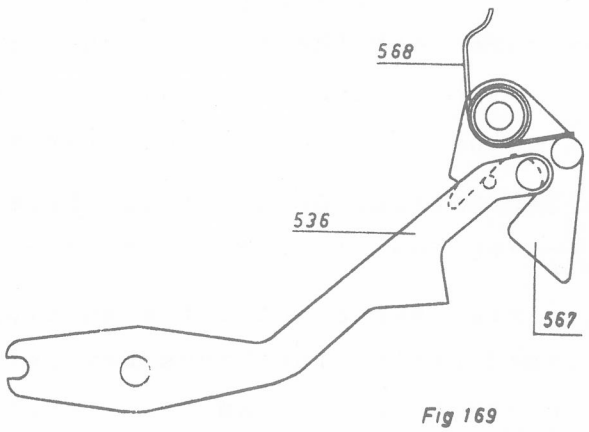
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Fig 169

166. Install the Ribbon Feed Lever [557] with Paper Feed Dog [558] and Paper Feed Cut Out Lever [560] on Shaft [447] - Page 110. Check correct location of these parts per Fig. 166: The Minus Key Lever is placed between the ends of the Ribbon Feed Lever [557]. The curved extension of the Ribbon Feed Lever is placed behind the stud of the Bichrome Lever [523] and the rear end is connected to the stud of Ribbon Feed Arm [534]. The Paper Feed Dog [558] is placed under and behind the Minus Key Lever [379] and under the Multiplier Setting Bridge [542]. The Paper Feed Cut Out Lever [560] is located to the left of the Minus Key Lever [379] so that its rear can be actuated by the Cam "4". Now insert Shaft [447] fully and secure it by means of three retainers on the left and one on the right hand side.

167. Connect Springs [561 & 562, Page 110].

168. Insert Shaft [455] and replace retainer on its right end. Install Symbol Eliminator [566] on the left end of the shaft [455] - Page 110 - seeing that the shoulder stud of the Sign Eliminating Lever [374, Page 111] is located into the notch of the Symbol Eliminator.

169. Install Symbol Print Trigger [567] with Torsion Spring [568] Page 110. The Symbol Print Trigger is placed behind the Blocking Impulse Lever [536] as shown in Fig. 169. Secure with Retainer [569] - Page 110.

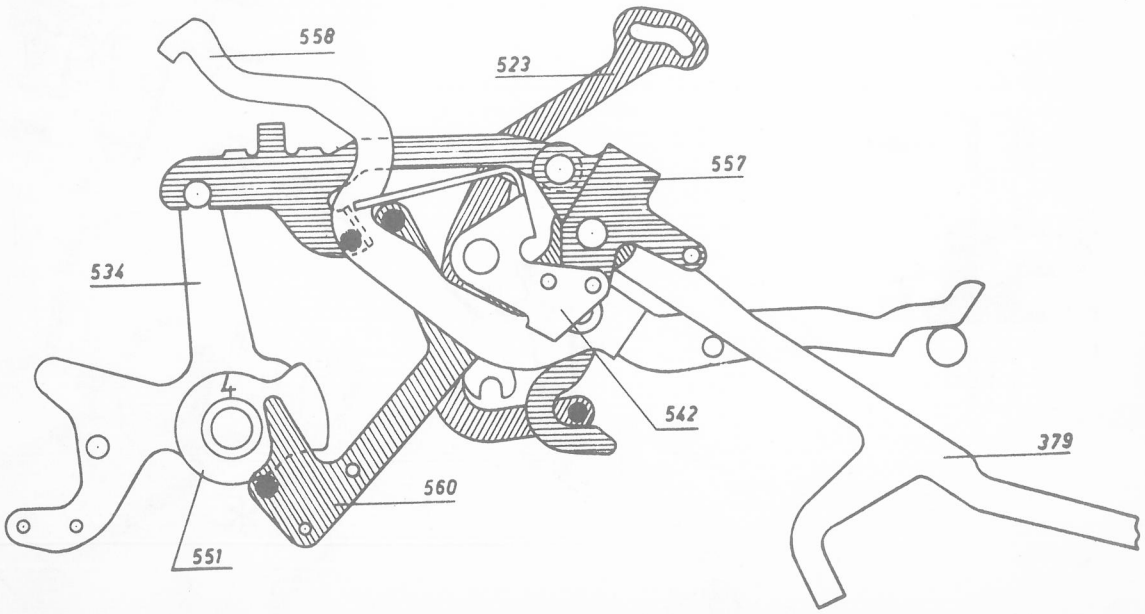

Fig. 166

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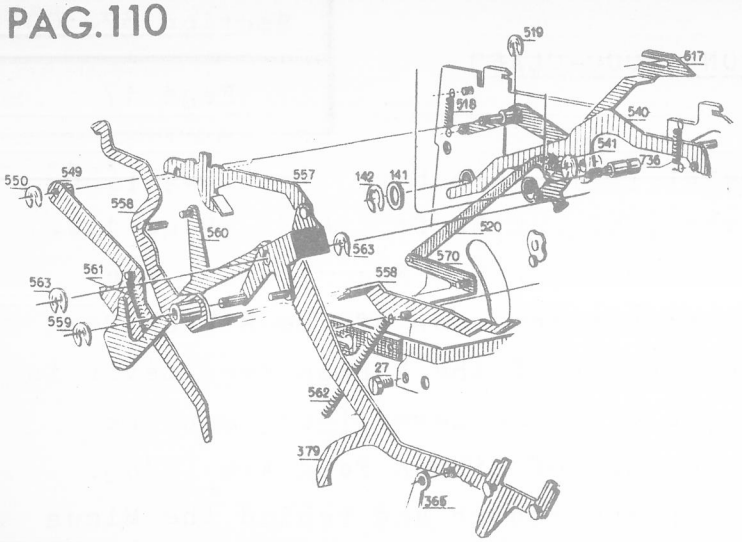

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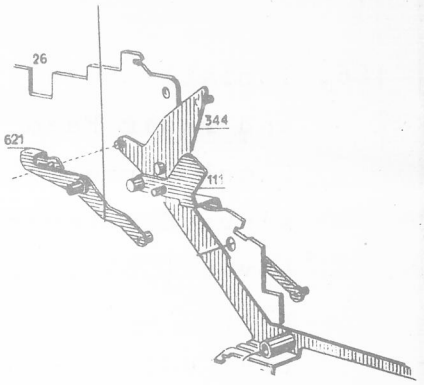

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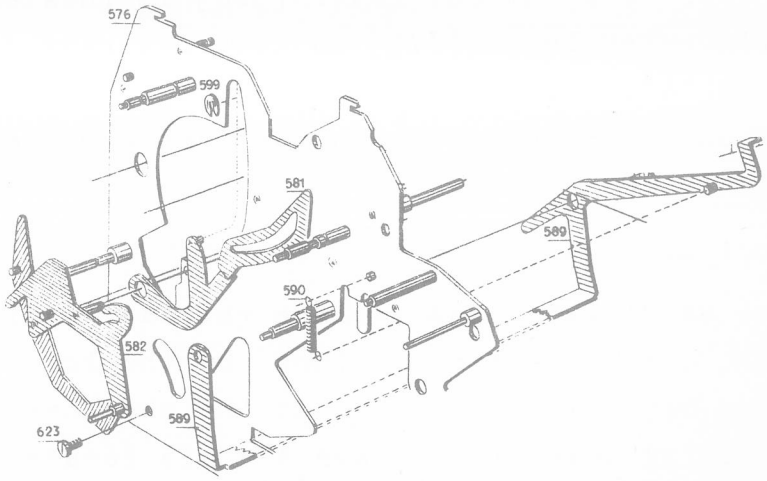

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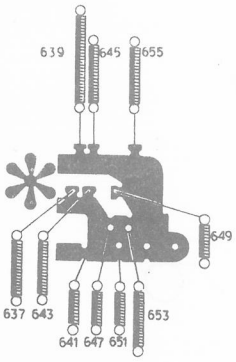

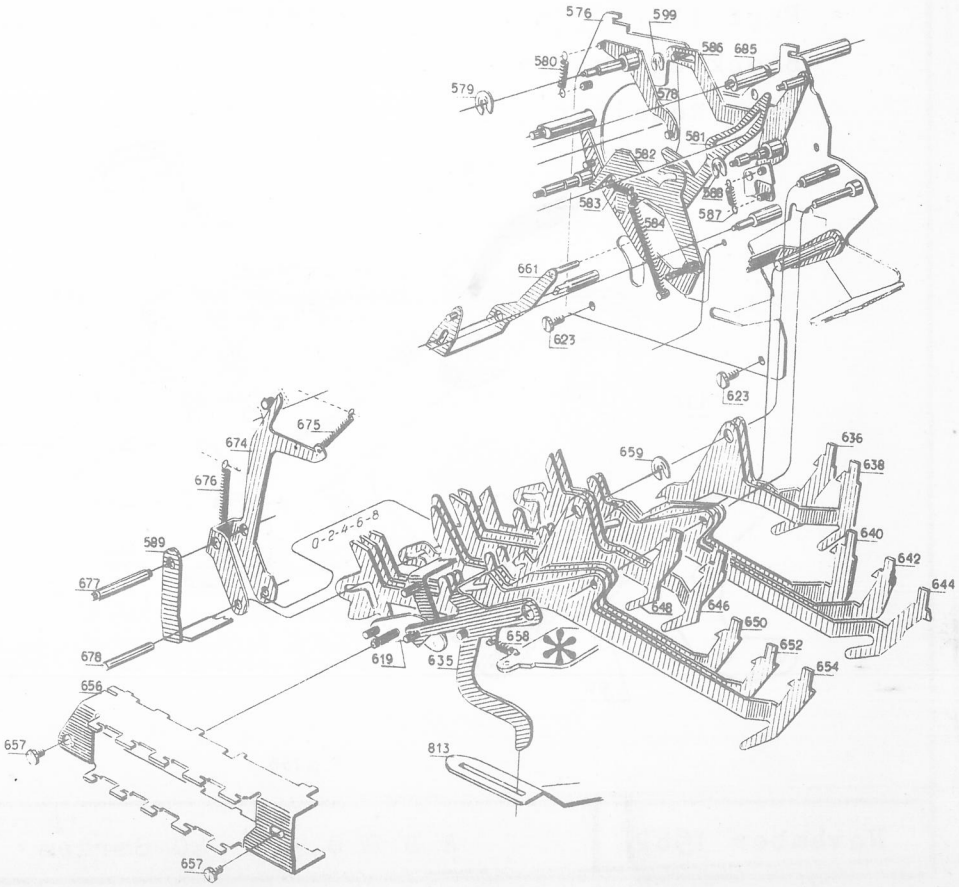

170. Replace the Non Add Bridge [570] on its fulcrum stud and on the stud of the Non Add Connecting Link [520] - Page 110.

Inner Frame Plate [576] and Key Box [656] - Page 108 -

NB.- THE MACHINE MUST BE IN ITS INITIAL POSITION

171. Position the Paper Feed Disengaging Lever [621] on the stud of the Release Operating Lever [344] - Page 111 - seeing that its front end is placed under the Paper Feed Dog [558] - Page 110. Final installation of the Paper Feed Disengaging Lever is made later, at the same time as the assembled Inner Frame Plate. The Lever is then fulcrumed on the same pivot as the Ball Locking Bridge.
Check the following points before installing the Inner Frame Plate:

a/ Should any parts have been removed from the Inner Frame Plate, replace these parts per Pages 108 & 109 of the Parts Catalogue.

b/ Check that the Spring [580] is attached to the stud of the Detent [578] - Page 108.

c/ Springs [583, 584, 587, Page 108] and Spring [590, Page 109] must be connected as shown on Pages 108 & 109 of the Parts Catalogue.

d/ Parts [619 & 635, Page 108] must be correctly positioned in relation to the Key Stems.- Parts Catalogue shows their right positions -. Also check Start Initiator [635] for squareness.

e/ If the Key Stem Springs have been disconnected, reattach Springs per separate sketch on Page 108 of the Parts Catalogue. The number of a spring is one unit higher than that of the corresponding key stem, e.g. spring 637 is connected to Key Stem 636; Spring 639 is connected to Key Stem 638 and so on.

f/ Check Key Box [656, Page 108] for correct location between the Key Stems.

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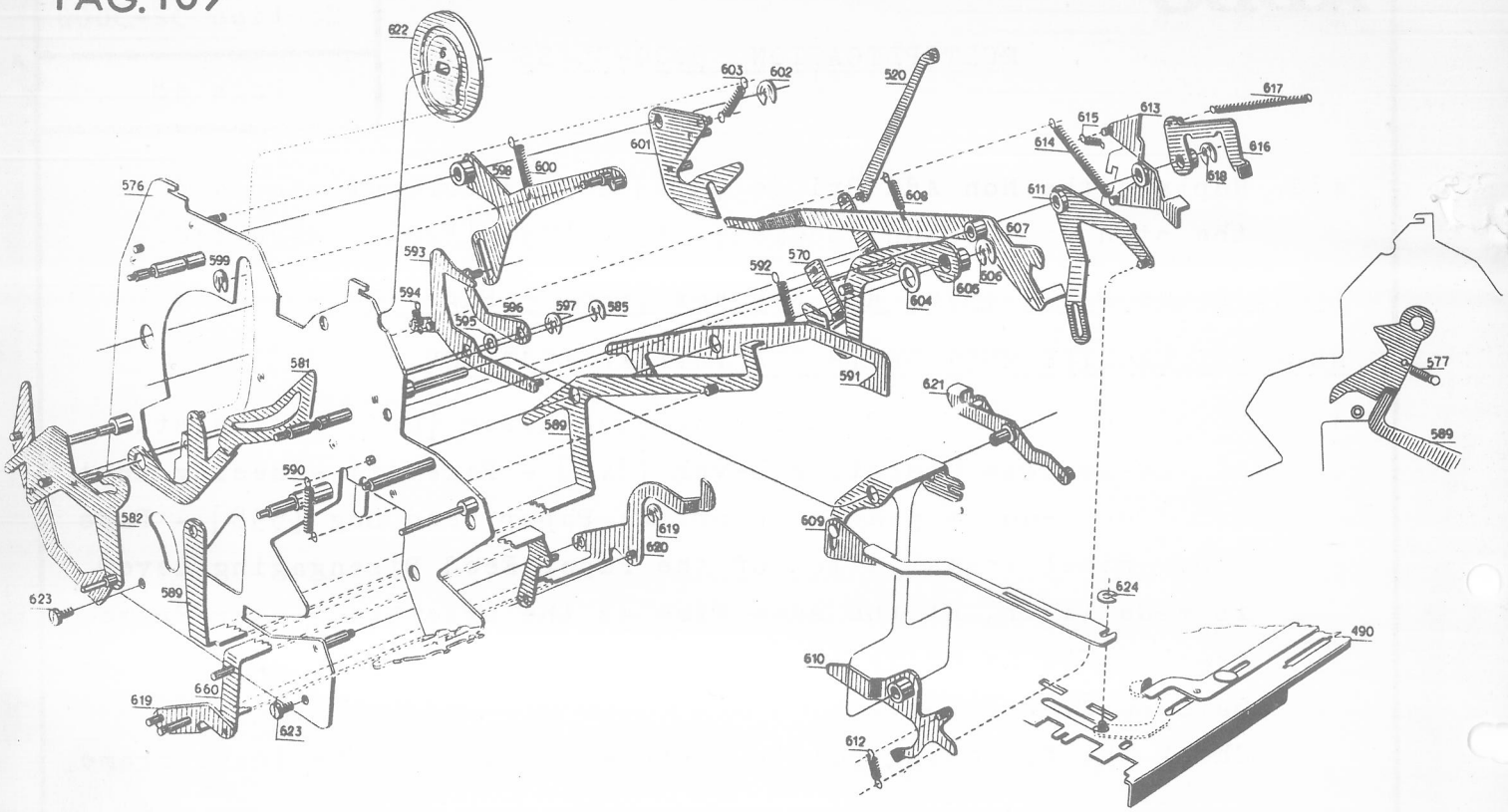

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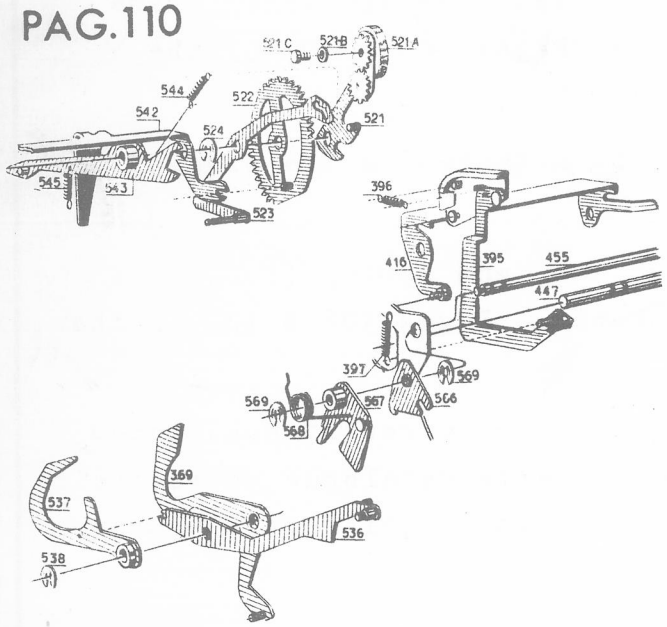

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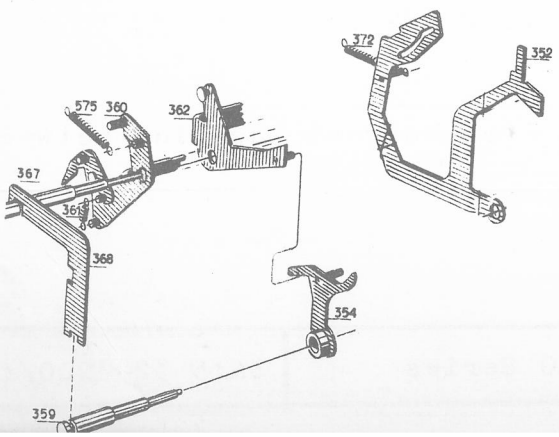

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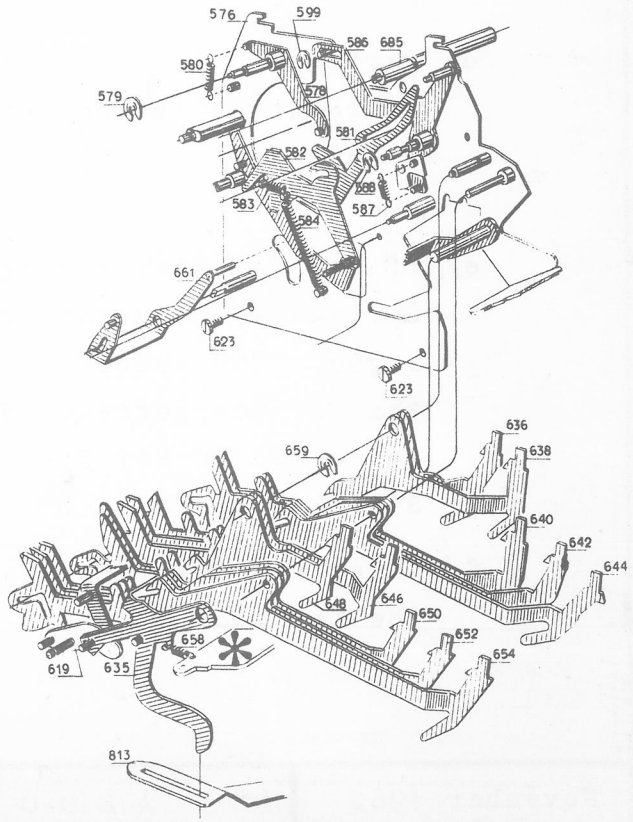

g/ Check on the inside of the Inner Frame Plate that the Springs [603, 600, 594, 592, 608, 614, 612, 577, Page 109] are attached to their parts.

h/ Spring [575, Page 111] must be attached to the stud of the Inner Frame Plate that is situated behind the front end lug of the Minus Lever [607, Page 109].

i/ Attach the Spring [615, Page 109] to the Red Print Rocker [613, Page 109].

j/ Attach the Spring [617] to the Lever Detent [616]-Page 109.

k/ Finally, position the Internal Cam "6" [622, Page 109] in the aperture of the Inner Frame Plate. The stud of the Rocker Operating Lever [581, Page 109] must be in the groove of the Internal Cam.

172. Now install the Inner Frame Plate [576] lifting the Ball Locking Bridge Link [609] - Page 109 - to facilitate installation.

173. Push the Inner Frame Plate into position seeing that the Internal Cam "6" is fulcrumed on the One-turn Shaft, and that the Camshaft fits in its bearing. Be sure that the One-turn Coupling Detent Arm [582] position behind the Camshaft as shown on Page 108. Check that the rear lower shaft fits in the hole of the Inner Frame Plate and holds it in place. When locating the Inner Frame Plate on the front shaft, replace Start Initiator [635, Page 108] at the same time. Note that the right end of the Start Initiator must be placed on the OUTSIDE of the Inner Frame Plate as shown on Page 108. Do not use force if you feel any obstruction during installation: The Plus Bridge [620, Page 109] usually interferes with the Start Keeping Bridge [360, Page 111]. Rotate the Plus Bridge and clear it by lifting the latch on the Start Keeping Bridge.

Be sure that the space collar on the camshaft does not bind against the arm of the One-turn Coupling Detent [582, Page 108].

Check that the Paper Feed Disengaging Lever [621] is located on the same pivot as the Ball Locking Bridge [609]-Page 109.

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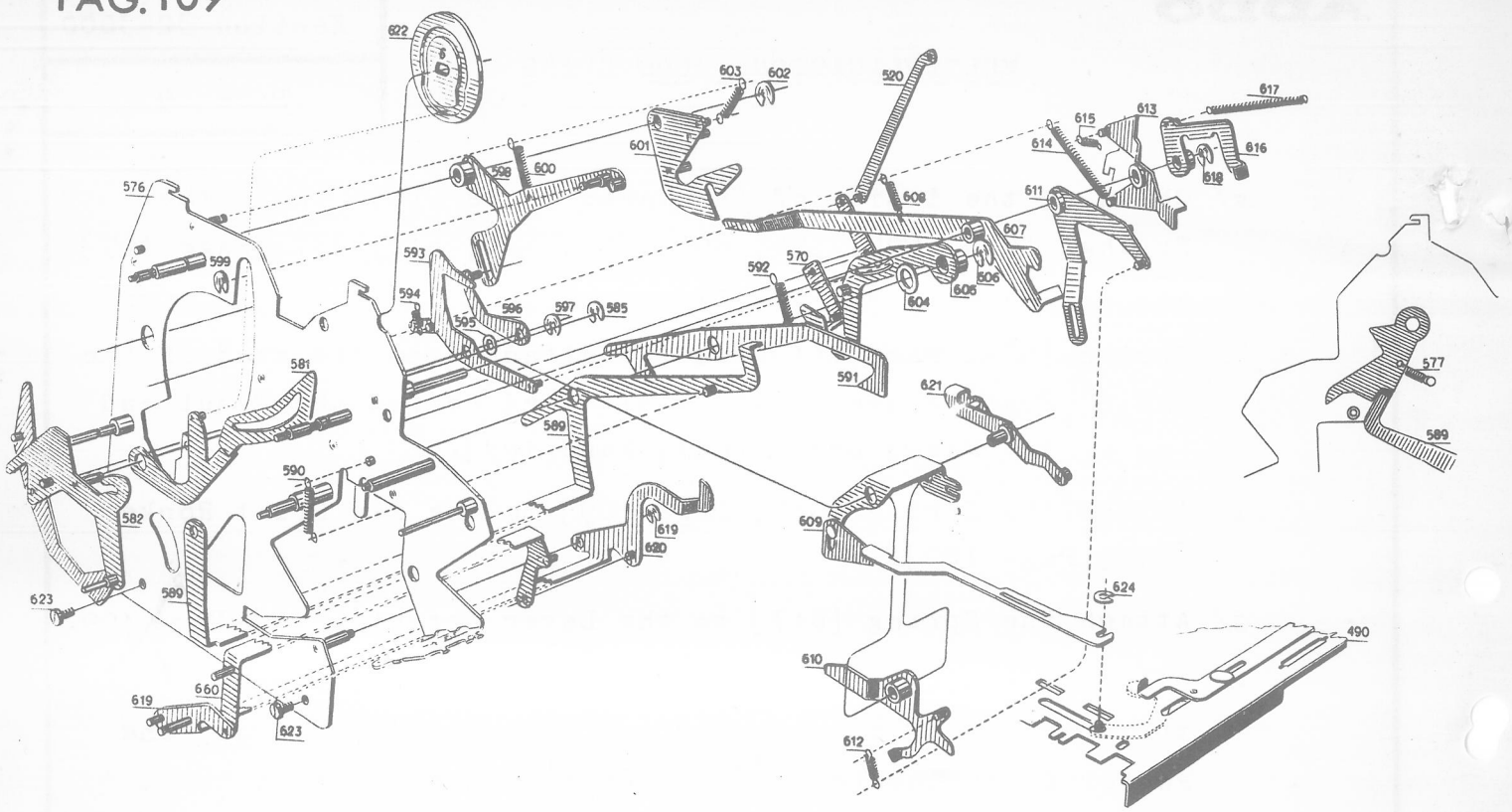

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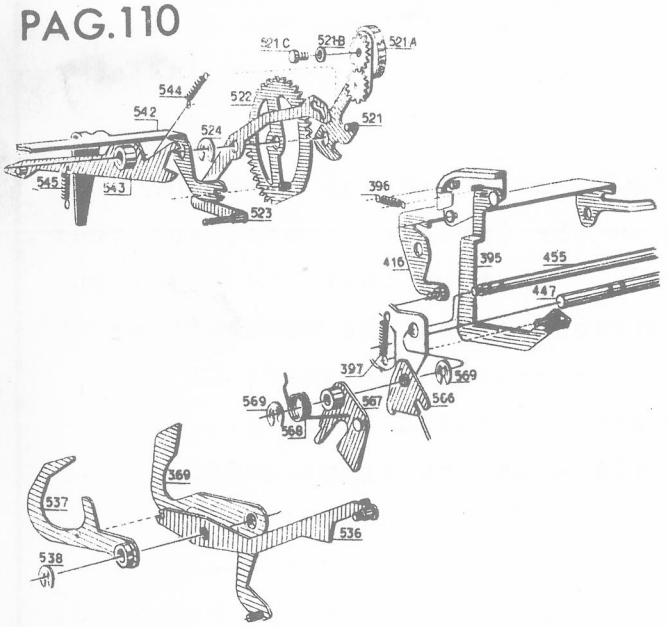

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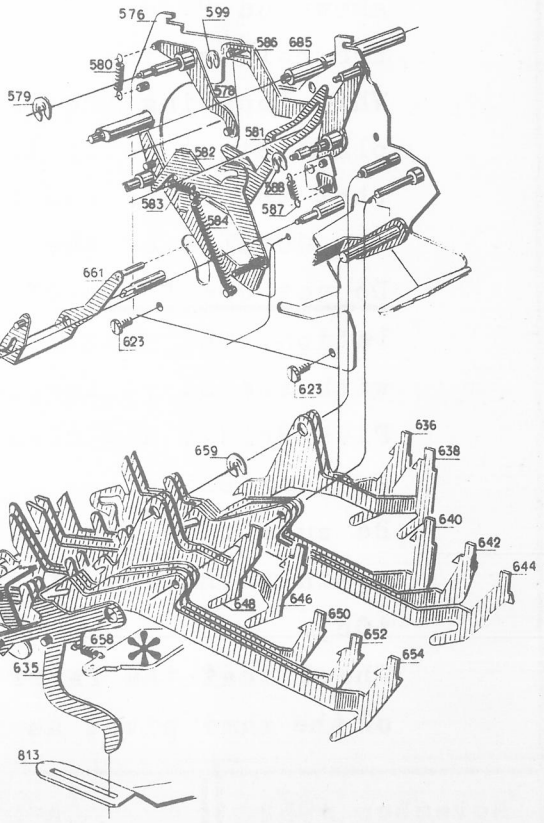

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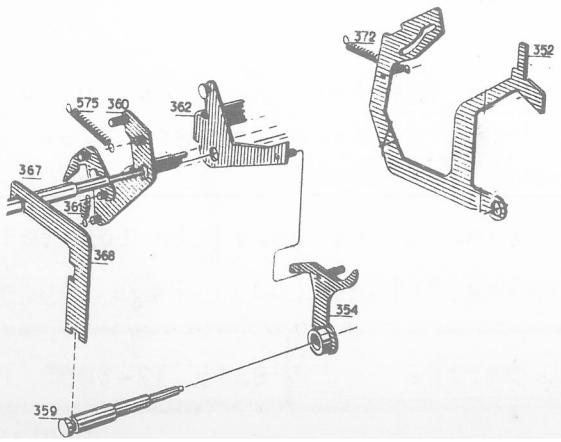

Swing the Free Return Driver [601, Page 109] so that its stud comes behind the Double Cam "22".
The stud of the Non Add Bridge [570] must be placed over the Non Add Setting Lever [605] and the Bridge must be fulcrumed on its pivot on the Inner Frame Plate.
When the rear end of the Inner Frame Plate is close by the Base Plate of the machine, replace one Screw [623, Page 109], without tightening, to keep the rear end in place.

174. Connect the Link of the Ball Locking Bridge to the stud of the Key Board, fitting the stud of the Blocking Impulse Lever [536, Page 110] into the notch of the Ball Locking Bridge [609, Page 109] at the same time. See that the corner of the Detent [354, Page 111] is located in the slot of the Ball Locking Bridge Link.

175. Using a screwdriver and facing the front of the machine, lift the Red Print Rocker [613, Page 109], and position the Plus/Minus Lever [352, Page 111] to the left of the Red Print Rocker. The stud of the Plus/Minus Link [611, Page 109] must be located in the slot of the Plus/Minus Lever. The Lever Detent [616, Page 109] is placed over the Plus/Minus Lever.

176. The stud of the Start Initiator [635, Page 108] must engage in the latch of the Start Keeping Bridge [360, Page 111]. Turn the latch clockwise if required.

177. Attach the Spring [658] to the Start Initiator [635] - Page 108.

178. Replace the other Inner Frame Plate Securing Screw [623, Page 108] and tighten both screws.

179. Secure the link of the Ball Locking Bridge with Retainer [624, Page 109].

180. Check correct location of the Key Box in relation to the Key Stems and secure it with two Screws [657, Page 108].

181. Connect the Spring [575] from the stud of the Inner Frame Plate to the Start Keeping Bridge [360] - Page 111.

182. Connect the Spring [615, Page 109] from the Red Print Rocker [613] to the Bichrome Lever [523, Page 110]. Connect Spring [617, Page 109] to the Shaft [455, Page 110].

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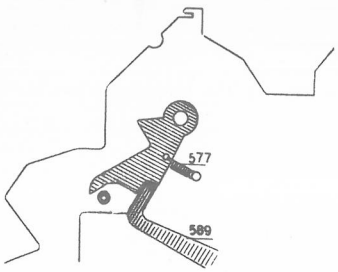


Fig. 183

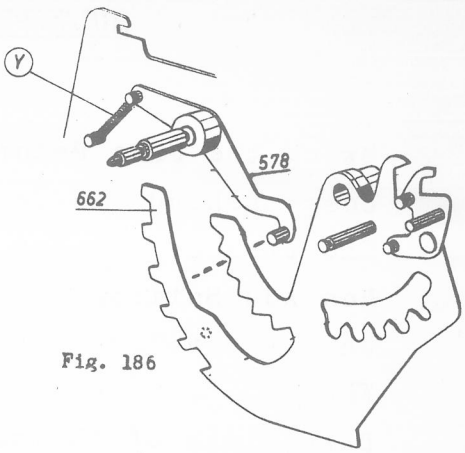
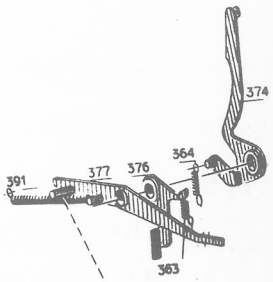
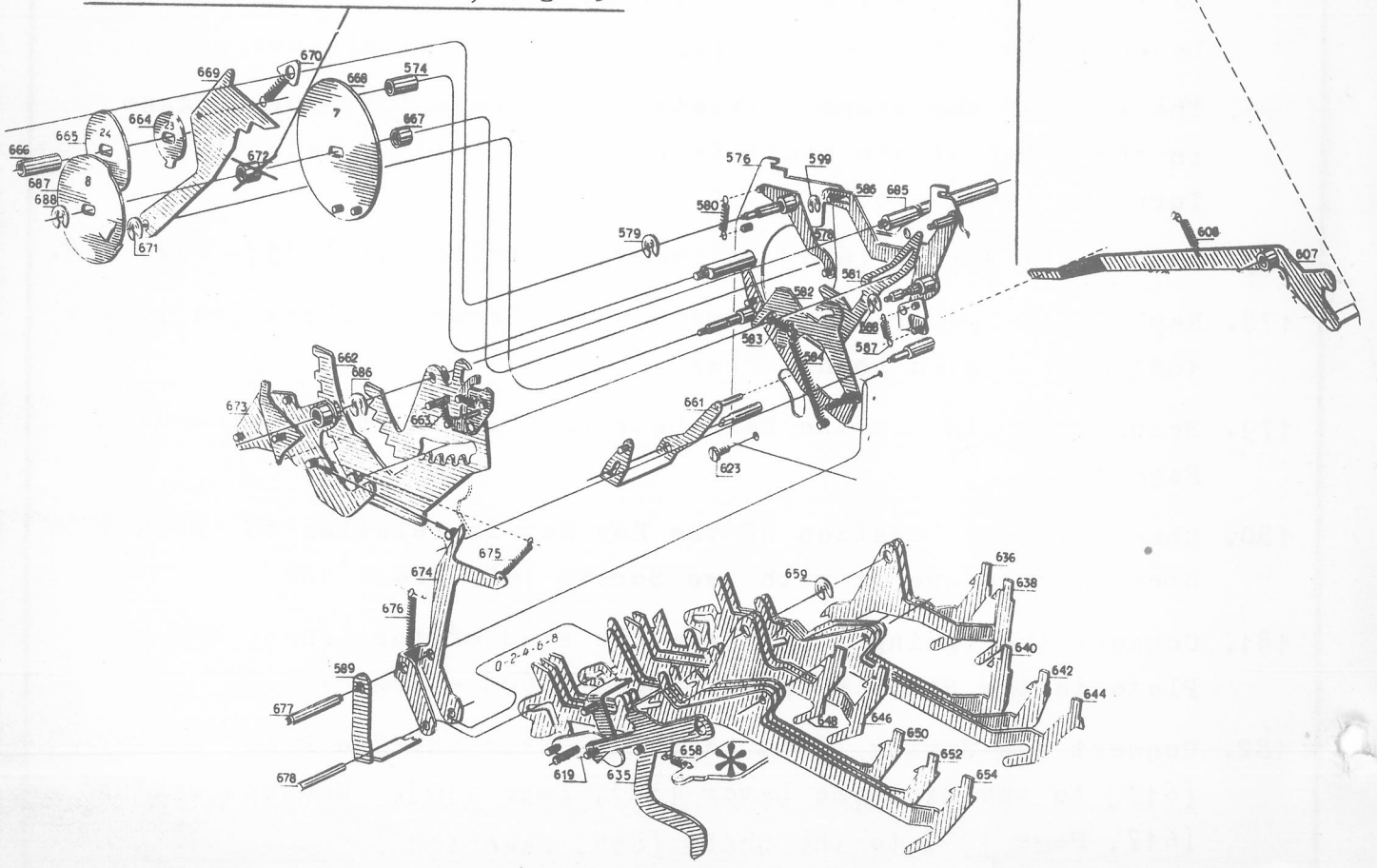


Fig. 186



See Section 32M-3000, Page 5



183. Check that the latch on the inside of the Inner Frame Plate has its front corner over the stud of the Start Keeping Bridge [360, Page 111] and holds the Down Position Retainer [589] as indicated in Fig. 183.

Parts on the outside of the Inner Frame Plate

NB.- THE MACHINE MUST BE IN ITS INITIAL POSITION

184. Install the Minus Lever Actuator [661, Page 108] on the lower rear shaft. Using a screwdriver hold down the rear end of the Minus Lever [607, Page 109] in order to locate the long stud of the Minus Lever Actuator over the Minus Lever. At the same time, check the front lug of the Minus Lever for correct location under the Fifth Link Stud [377, Page 111].

185. The following assembly is facilitated by placing the machine on its right side.

186. Place the Register Segment [622] in an approximate position without inserting its Fulcrum Shaft [685] - Page 108. Attach Spring "Y" [580] so that the stud of the Detent [578] engages between the teeth of the Register Segment [622] as indicated in Fig. 186. The stud on the inside of the Register Segment is located in the notch of the One-turn Coupling Detent [582, Page 108].
[Due to a modification, the uppermost Spring Post, which was found on the very first Register Segments, is not used any more.]

187. Install the Back Feed Cam "23" [664], the Cam "24" [665] and the Spacer [666] - Page 108 - on the Camshaft.

188. Replace in order: Spacer [667], Register Segment Loading Cam "7" [668] and Spacer[672] on the One-turn Shaft - Page 108.

189. Connect Spring [675] from the Stroke Selector Bridge [674] to the Stroke Selector [673] - Page 108 - Be sure to position the Stroke Selector Bridge [674] in front of the stud as indicated on Page 108.

190. Place the Stroke Selector [673] on the Register Segment [622] seeing that the Stroke Selector Toggle Link gets its stud

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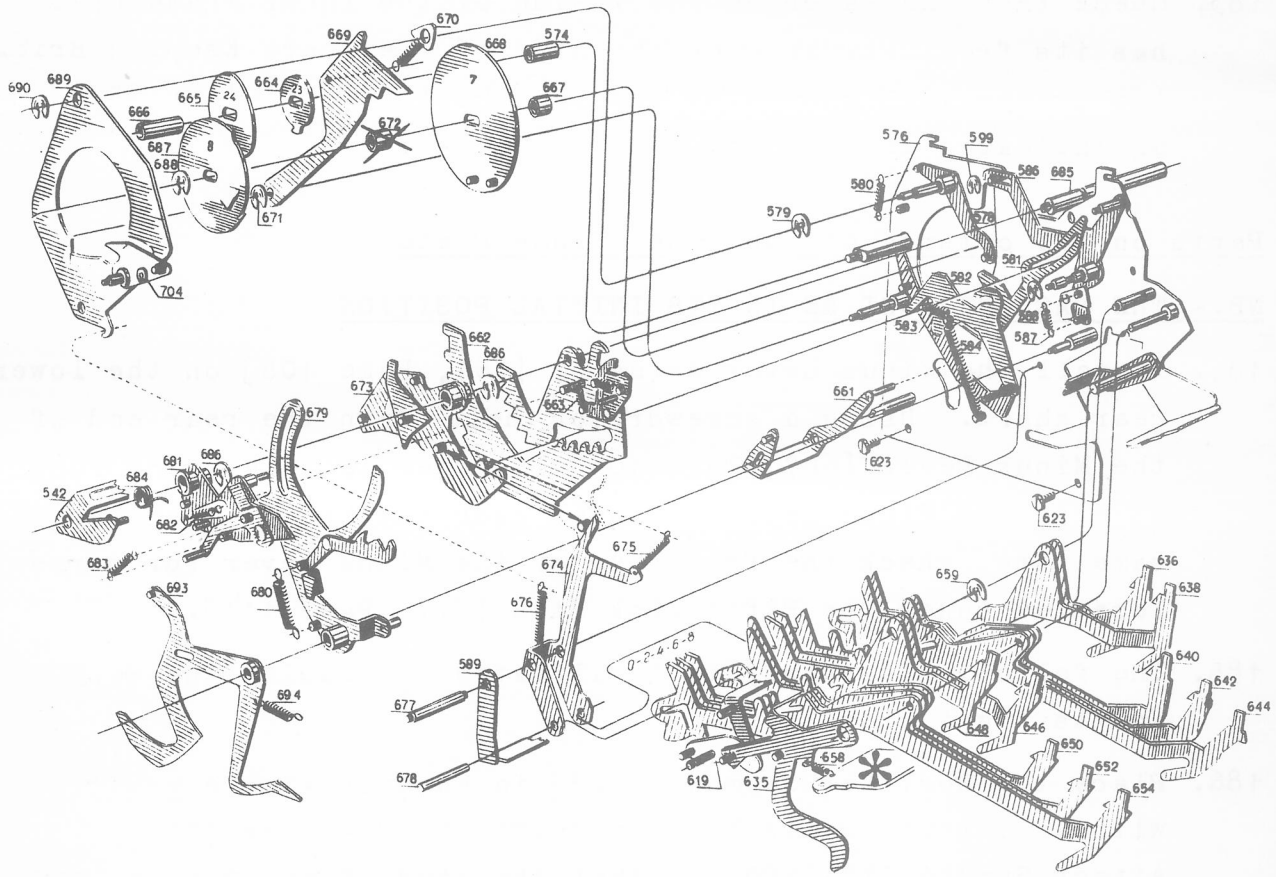
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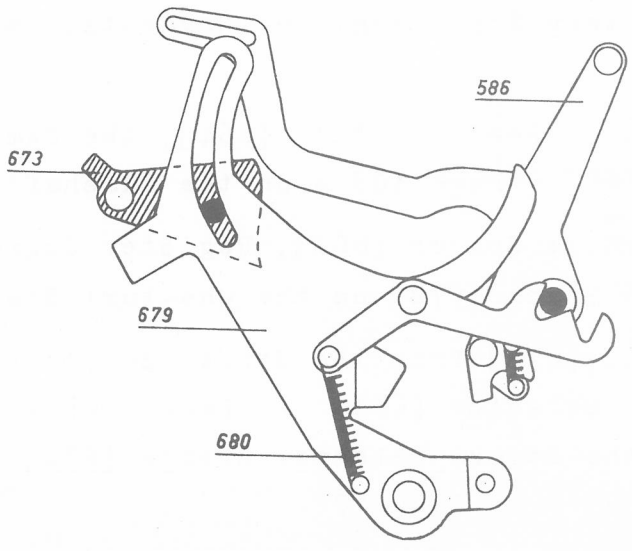
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Fig.194

through the aperture of the Register Segment [622] and into the slot of the Rocker Operating Lever [581] as indicated on Page 108 of the Parts Catalogue.

IMPORTANT: Be sure that the Stroke Selector Toggle Link points towards the Key Board, as improper location of the toggle link will cause the machine to jam.

191. Place Stroke Selector Bridge [674] so that Key Stems 0, 2, 4, 6, 8 come in between the legs of the Bridge. Insert Shafts [677 & 678] - Page 108 - being sure that the Shaft [678] is inserted through the slots of all Key Stems. See that Spring [676] is attached to the Stroke Selector Bridge.

192. Install Crossing Stroke Fork [679] on its pivot Stud - Page 108. Check location per Fig. 194. Spring [680] must be in place and the Stroke Selector Contour Shifter [673] must have its stud in the elongated slot of the Crossing Stroke Fork.

193. Before attempting to replace the Connecting Lever [681] make sure that the Connecting Lever Springs [682, 683, 684, Page 108] are in place. Then put Connecting Lever [681] in place locating its shoulder stud into the notch of the Register Segment Rocker. The double spring post of the Register Segment must position in the aperture of the Connecting Lever.

194. Insert Tubular Fulcrum Shaft [685, Page 108], the large diameter hole pointing inwards.

195. Check correct location of the parts per points 186 to 194 above. Then connect Spring [682] to the double spring post of the Register Segment [662] and place Torsion Spring [684] over the stud of the Multiplier Setting Bridge [542] - Page 108.

196. Place the machine on its feet and replace two Retainers [686, Page 108].

197. Replace Positioning Lever [669, Page 108]. Be sure to locate Positioning Lever between the Camshaft and the One-turn Shaft so that its upper ear comes behind the upper rear pivot stud of the Inner Frame Plate. Connect Spring [670] and secure Positioning Lever [669] with Retainer [671] - Page 108.

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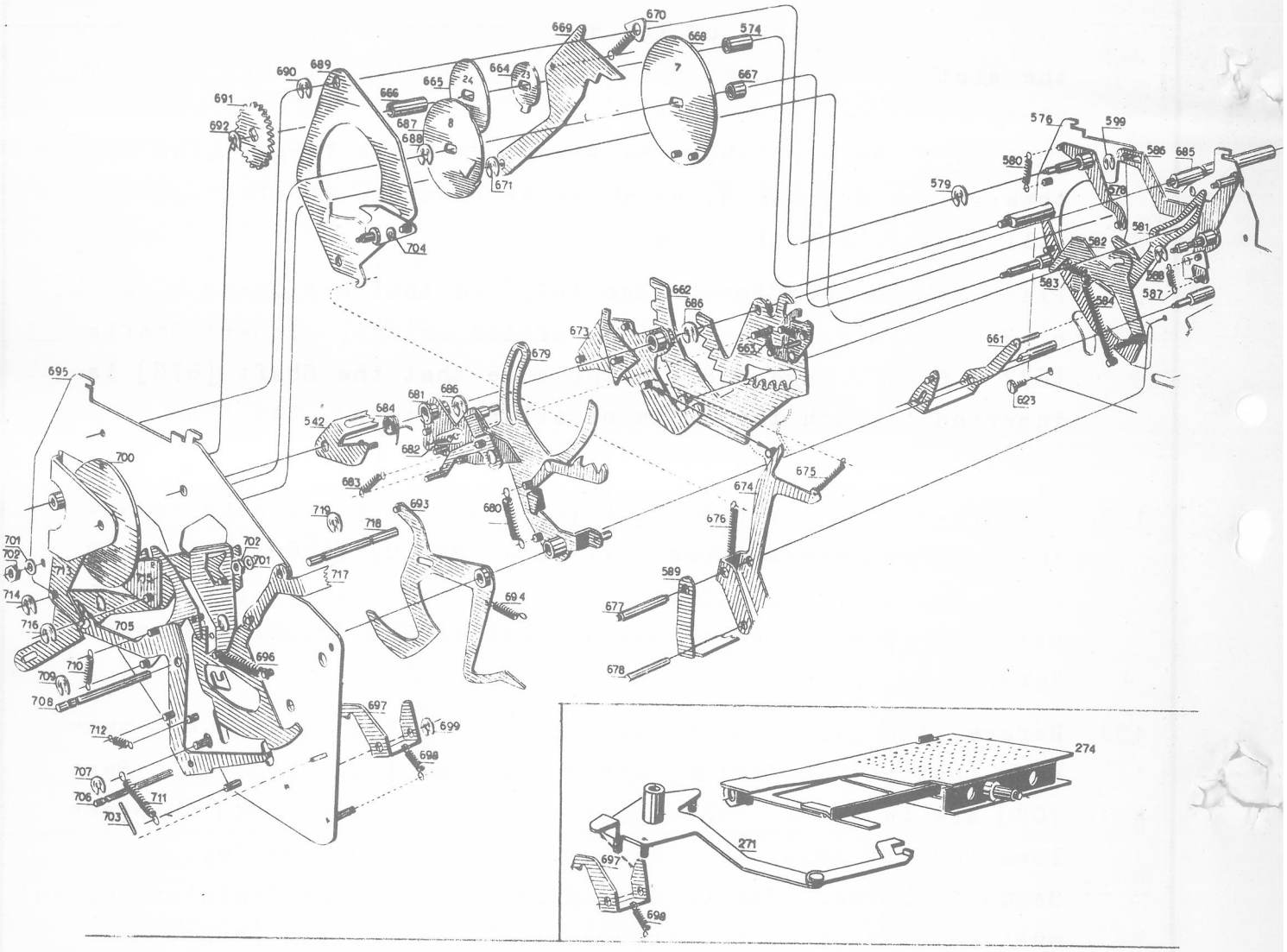
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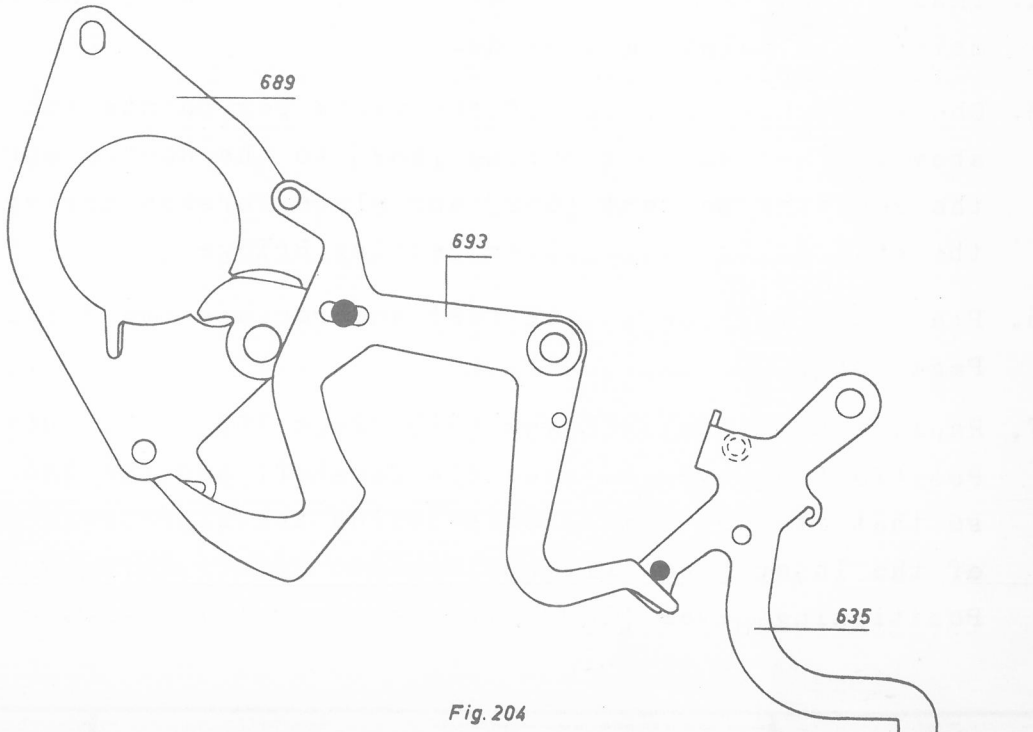
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Fig. 204

198. Replace Clutch Cam "8" [687] and Retainer [688] - Page 108 -

199. Install Guide Plate [689] on the studs above and under the One-turn Shaft [the stud under the One-turn Shaft is not shown in Fig.] and secure with two Retainers [690] - Page 108.

200. Connect Selector Bridge Spring [676] to the Guide Plate [689] Page 108.

201. Replace Gear [691] and secure it with Retainer [692]- Page 108.

202. Install the One-turn Coupling [693] on its pivot stud - Page 108. Check correct location of this part in relation to the Start Initiator [635] per Fig. 204. The stud of the Block-out Cam must be located in the slot of the One-turn Coupling [the Block-out Cam is riveted to the Guide Plate [689]. Be sure to position the lower rear extension of the One-turn Coupling[693] between the Stroke Selector Bridge [674] and the left end of the Down Position Retainer [589] - Page 108 -. One-turn Coupling Spring [694] is connected later [see point 209].

Outer Frame [695] - Page 108 -

NB.- THE MACHINE MUST BE IN ITS INITIAL POSITION

203. See that the Full Capacity Blocking Bridge [697] with Spring [698] is properly located on the inside of the Outer Frame [695] - Page 108. Place the Clutch Drive Plate [700, Page 108] into the aperture of the Outer Frame.
Be sure that the machine is in its initial position [= Ratchet Pawl [224] behind lug of Starting Lever [217] - Page 113 -].

204. Trip the Stop Carriage 10 spaces to the left with a figure key. Should this not be possible due to the Universal Slide [95] - Page 113 - blocking the keyboard, keep rear of Starting Lever [217] down and restore Universal Slide. When indexing figures in the keyboard, you will notice that the Stop Carriage Actuating Anchor [271, Page 105] moves towards the rear into a position that will facilitate installation of Outer Frame.

205. Before installing the Outer Frame, check the following parts for proper location:
a/ The stud of the Minus Lever Actuator [661, Page 108] must

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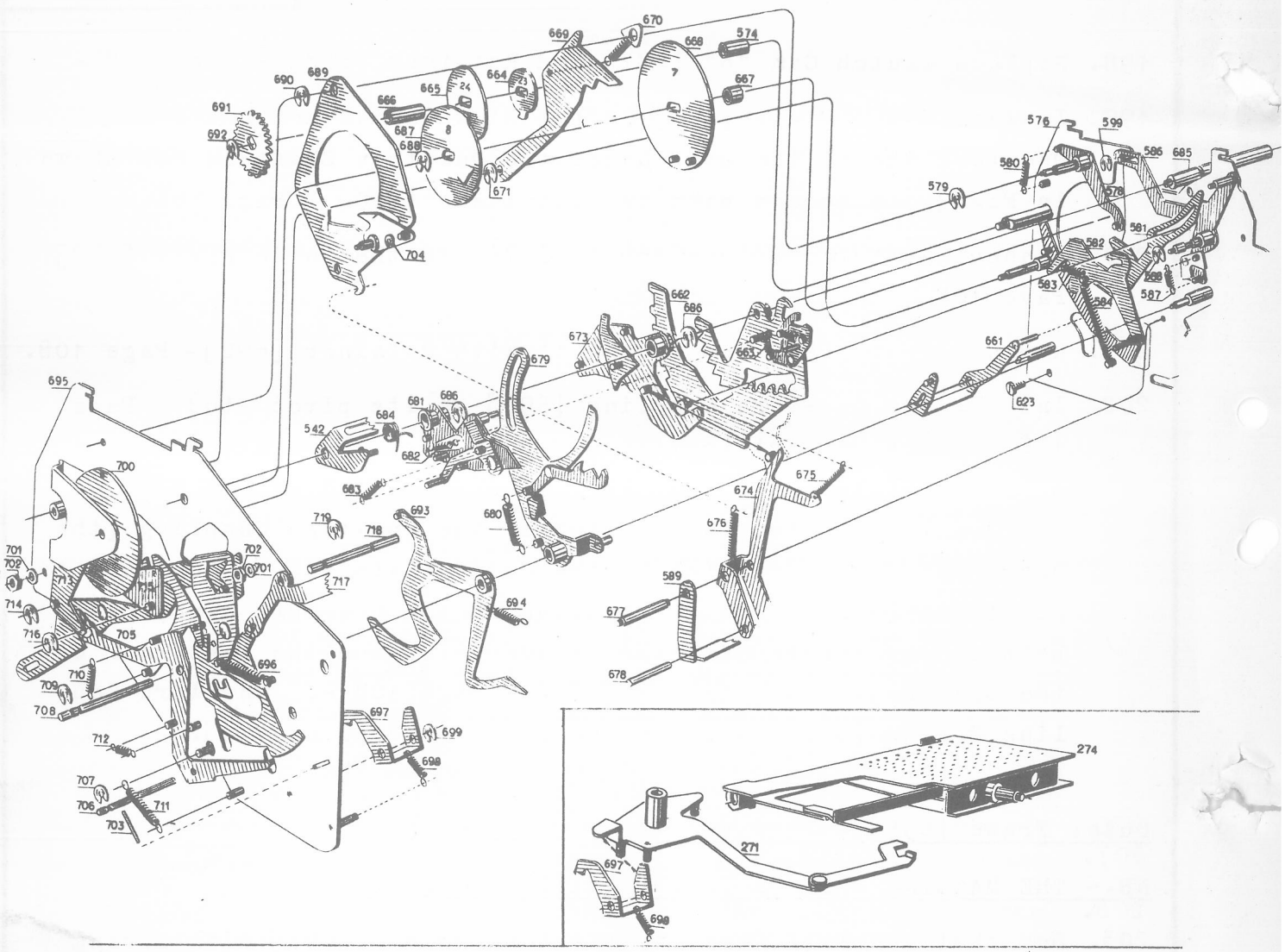
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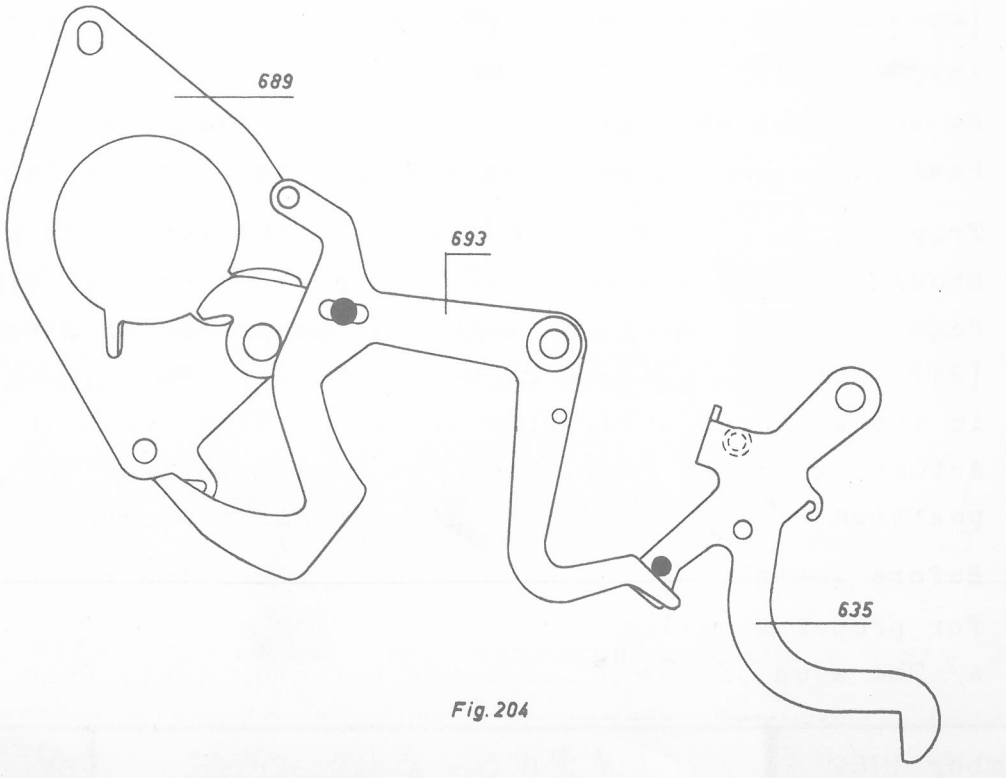
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Fig. 204

position over the Minus Lever [607, Page 109].

b/ Shaft [677, Page 108] must fit in the hole of the Inner Frame Plate.

c/ Shaft [678, Page 108] must be located through the slots of all Key Stems.

d/ The One-turn Coupling must be placed as outlined on point 202.

e/ The stud of the Add Retaining Bridge [660] must be in the slot of Plus/Minus Link [611, Page 109].

206. Now install Outer Frame [695, Page 108]. With the machine in its initial position, locate the Clutch Drive Plate [700, Page 108] so that its holes align with the small notch of the Outer Frame [695]. Then push Outer Frame into position seeing that all pivot studs and shafts come in their right bearing holes. Note that the Full Capacity Bridge [697] must be placed in front of the lug of the Stop Carriage Actuating Anchor [271, Page 105]. The left end of the Full Capacity Bridge [697] must be placed over the front stud of the Start Initiator[635] Page 108.

207. Replace two Nuts [702] with Lock Washers [701] - Page 108 -.

208. Insert Pin [703, Page 108] into the hole of the Spring Plate.

209. Connect One-turn Coupling Spring [694, Page 108] to Frame.

210. Replace Retainer [704, Page 108] on the stud of the Guide Plate [689].

211. Replace Mult. Key Locking Bridge [717, Page 108] seeing that its right end positions on the stud of the Start Release Bridge [362, Page 111], and its left end on the stud of the Block-out Sector as indicated on Page 108.

212. Insert Shaft [718, Page 108] and secure it with two Retainers [719, Page 108].

213. Place the machine on its right side. Then install Minus Rocking Lever [705, Page 108] with its right end behind the Key Stems but in front of the shaft [678, Page 108]. Check proper location of the Minus Rocking Lever per Page 108.

214. Insert Minus Rocking Lever Upper and Lower Shafts [706 & 708]

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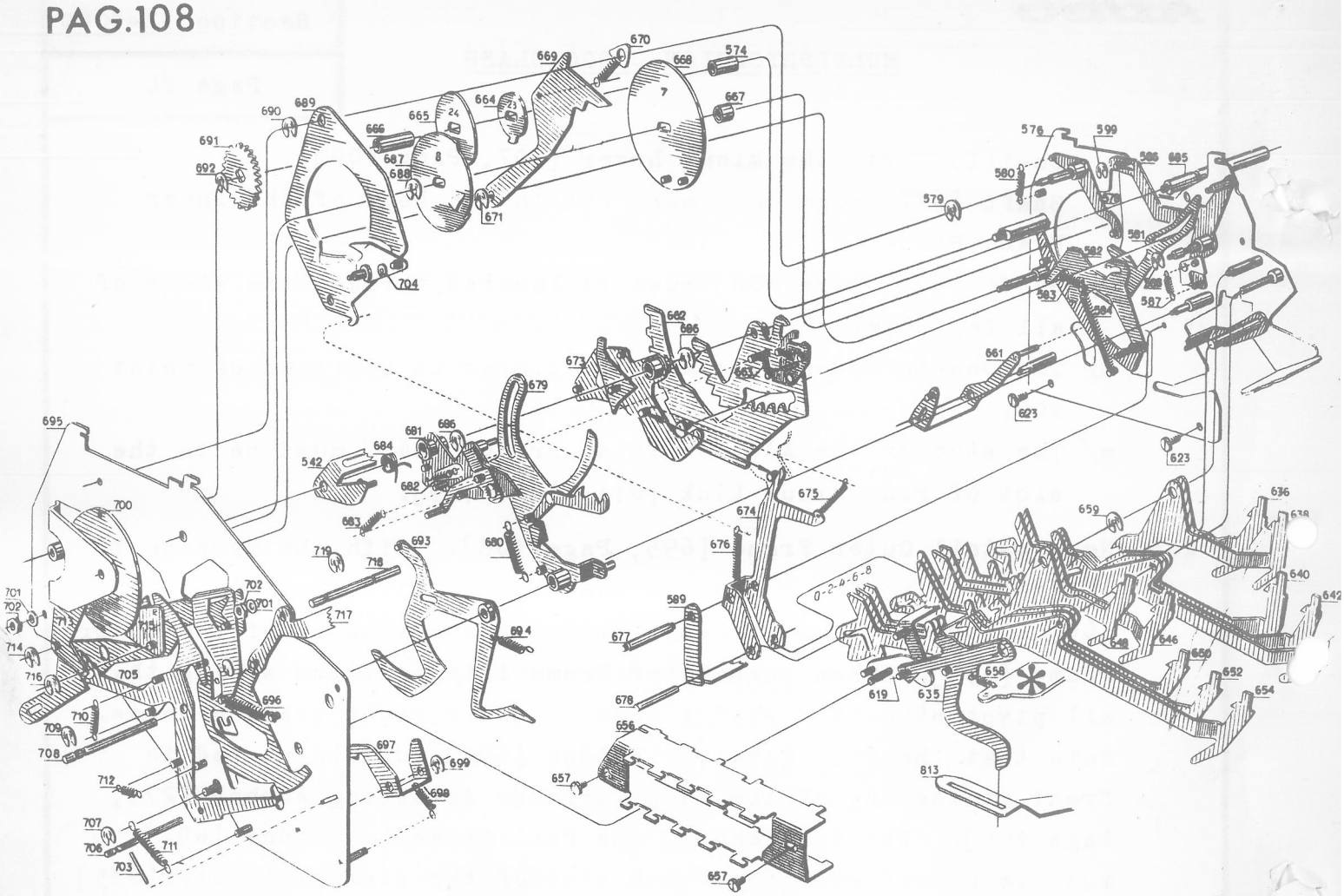
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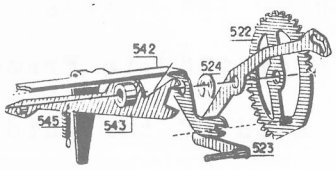
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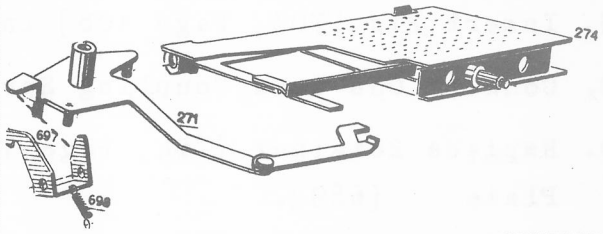
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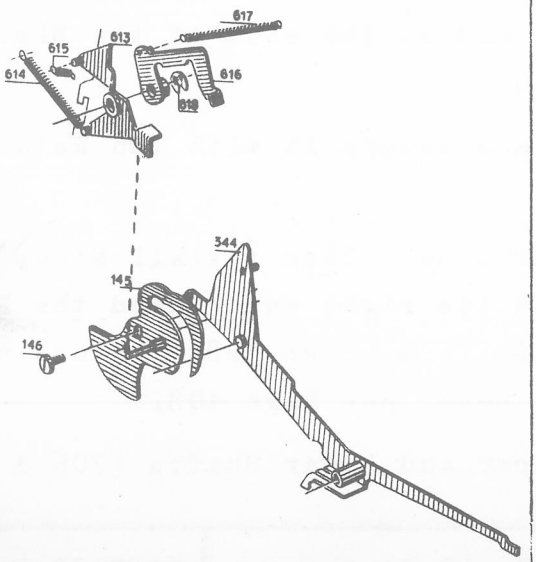
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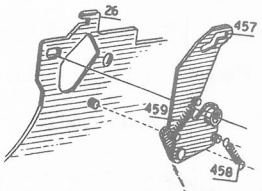
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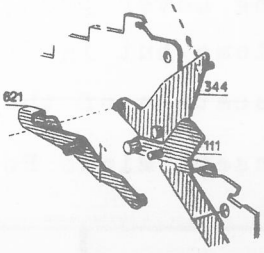
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and secure with Retainers [709 & 707] - Page 108 -

215. Connect Springs [711 & 712, Page 108]. See that the Spring [696, Page 108] is attached.

216. Replace Minus Rocker [713], Plus Rocker [715] - Page 108 - and secure with retainers.

Make the following inspections:

a/ The stud of the Release Cam [145, Page 110] must be under the Red Print Rocker [613, Page 109].

b/ Be sure that the holes of the Clutch Drive Plate [700, Page 108] line up with the notch of the Outer Frame.

c/ All Cam Numbers must point upwards.

d/ The stud of the Release Operating Lever [344, Page 110] must be under the Decimal Release Cam [457, Page 107].

e/ The stud of the Start Initiator [635, Page 108] must be over the One-turn Coupling [693, Page 108].

f/ The stud of the One-turn Coupling must be on top of the Clutch Drive Plate Inner Cam [700, Page 108].

g/ The stud of the Stroke Selector [673] must be behind the Stroke Selector Bridge [674, Page 108]. Stroke Selector Bridge must be over Mult. Keys 0, 2, 4, 6, 8.

h/ Stroke Selector Toggle Link must point towards the key-board.

i/ Retainer [692] must be fitted between Gear [691] and Outer Frame [695] - Page 108 -

j/ There must be two Retainers on Shaft [685], one behind Connecting Lever [681] and one behind Stroke Selector [673] Page 108.

k/ Stud of Release Operating Lever [344] must be in slot of P.F. Disengaging Lever [621] - Page 111 -.

l/ Stud of Multiplier Segment [522] must be in the notch of Multiplier Setting Bridge Right Arm [542] - Page 110 -.

m/ Full Capacity Blocking Bridge [697] must be under the lug of Stop Carriage Actuating Anchor [271, Page 105].

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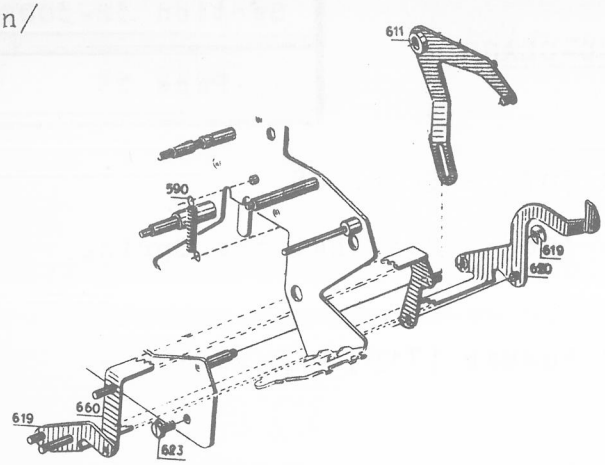
n/



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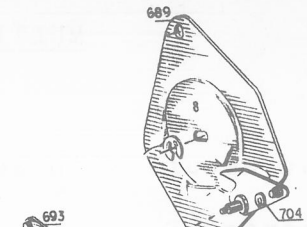

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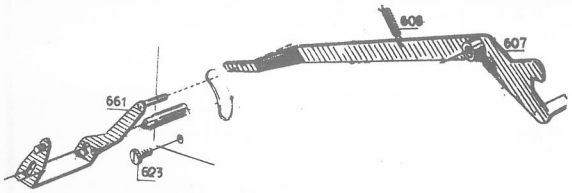

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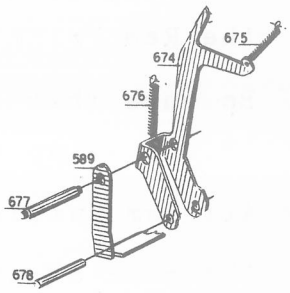

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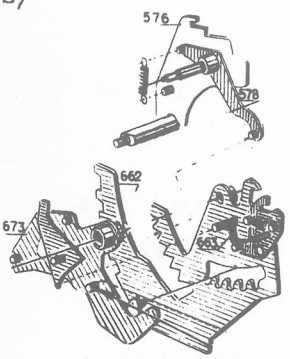

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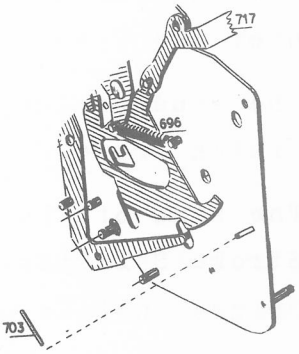
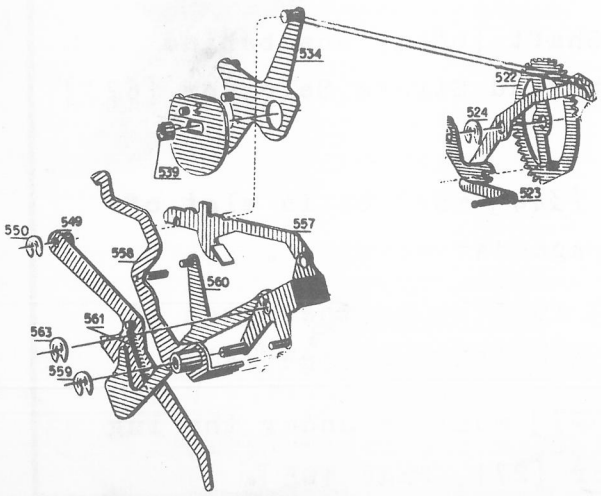
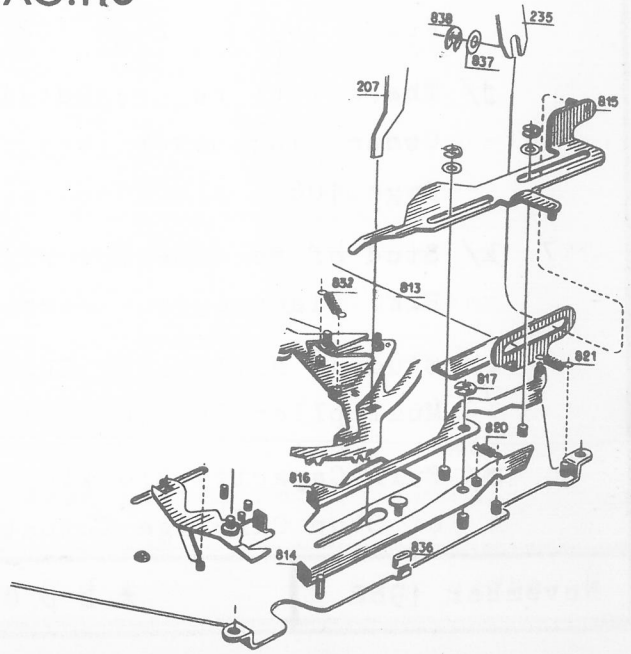


Rubber Band



PAG.116



n/ Stud of Add. Retaining Bridge [660] must be in slot of Plus/Minus Link [611] - Page 109 -.

o/ Block-out Cam on Guide Plate [689, Page 108] must be in its right position under the shoulder of Clutch Cam "8".

p/ Stud of Block-out Cam must be in slot of One-turn Coupling [693, Page 108].

q/ Stud of Minus Lever Actuator [661, Page 108] must be over Minus Lever [607, Page 109].

r/ Be sure that Shaft [677, Page 108] is properly located and that the Down Position Retainer [589, Page 109] has not come down on end of shaft.

s/ Stud of Detent [578] must be between the second and third teeth of the Register Segment [622] - Page 108 -.

t/ Pin [703] must not interfere with the Block-out Sector on the Outer Frame [695] - Page 108 -.

CAUTION:

To prevent distortion of parts, when operating the machine without Top Plate [722, Page 103], proceed as follow:
Attach a Rubber Band to the slot of the Bichrome Lever [523, Page 110]. While lifting the Ribbon Feed Lever [557], draw the Rubber Band towards the rear over the stud of the Ribbon Feed Arm [534] - Page 110 -. Replace the Ribbon Feed Lever [557] over the stud of the Ribbon Feed Arm [534] and fasten it firmly with the rubber band.
Operate the machine manually and check all functions.
As the Top Plate is not in place, the Stroke Selector Contour Shifter [673, Page 108] may allow the machine to make one stroke to much in multiplication, but this should not be interpreted a misfunction.

217. Replace Bottom Bearing Plate [813, Page 116] seeing that the machine and the Four Stroke Mechanism are in initial position [no excessive oil on bottom bearing plate].
Be sure that the Driver [235] is placed on the stud of the Four Stroke Slide [815]. Then push the Bottom Bearing Plate into position seeing that the Total Starting Lever [207],

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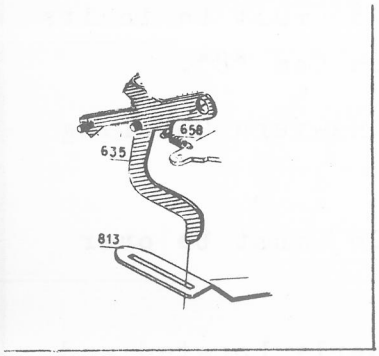

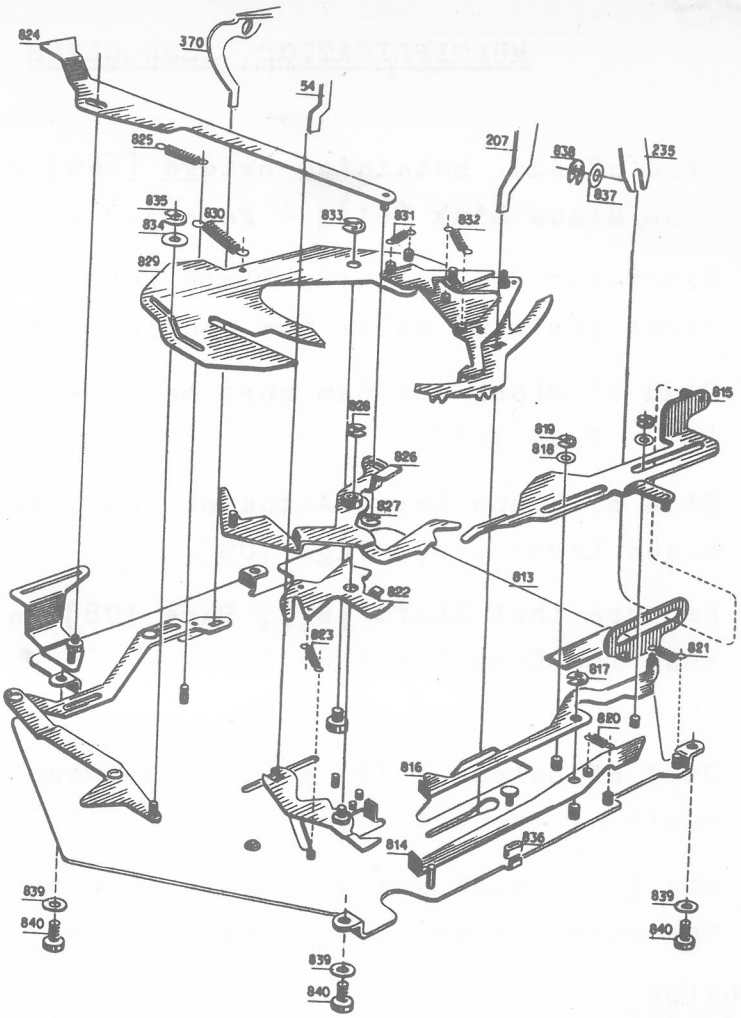

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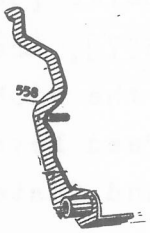

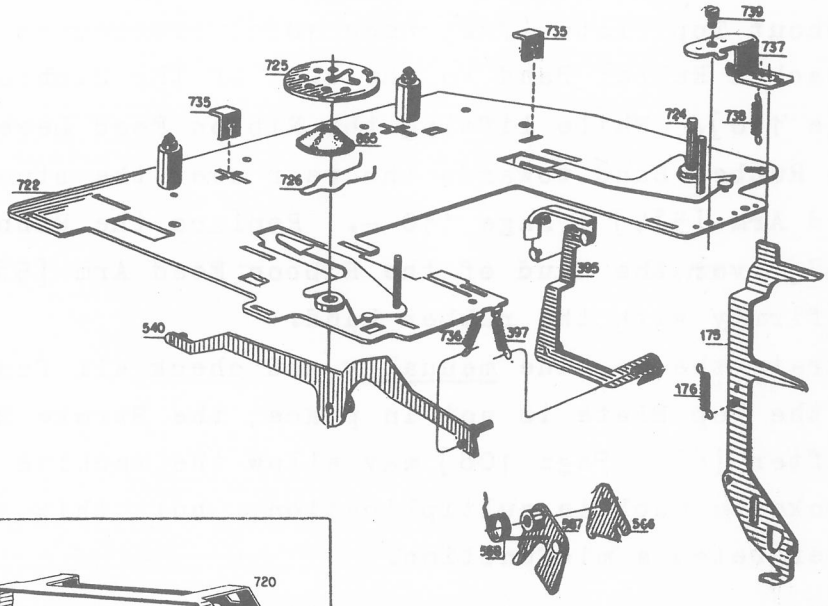

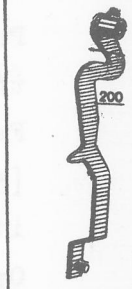

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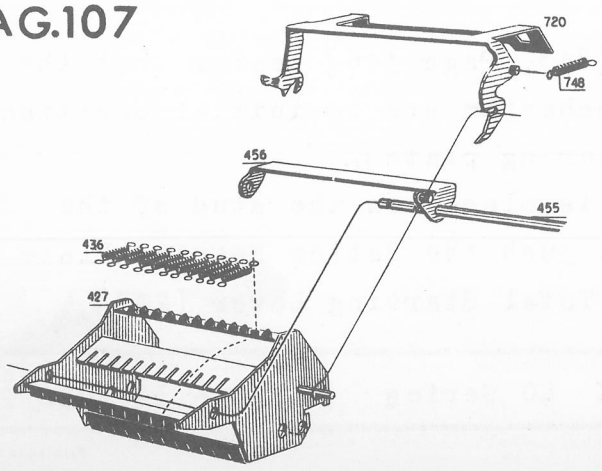

the Cut-out Lever [370], the tail of the Credit Signal [54] and the Start Initiator [635, Page 108] are located in the slots of the corresponding parts on the Bottom Bearing Plate as shown on Page 116 of the Parts Catalogue.
Care must be exercised not to bend the Start Initiator when replacing the assembled Bottom Bearing Plate.

218. Replace Bottom Bearing Plate Securing Screws [840] with Lock Washers [839] - Page 116 -.

Before operating the machine to check the function of the Four Stroke Mechanism, be sure to fasten one Rubber Band to keep Paper Feed Dog [558, Page 110] towards the rear of the machine, and one to keep Blocking Lever [200, Page 112] upwards.

Top Plate [722, Page 103] and Covers

219. Place Decimal Restoring Bridge [720, Page 107] over the studs of the G.T. Unit. The lug to the left is placed under the stud of the Restoring Lever [540, Page 110].

220. Start and operate the machine manually until the P.F. Dog has reachead its highest position. Remove Rubber Bands. Then install Top Plate seeing that the stud on the right end of the Decimal Restoring Bridge [720, Page 107] is placed over the Top Plate. The Symbol Eliminator must be located in front of the Top Plate, not under. Symbol Eliminator has ref. No. 566.

221. Replace three Top Plate Clamps [735, Page 103].

222. Connect Spring [397, Page 103] from Symbol Head [395] to the Top Plate - Page 103 -.

223. Place the curved end of Torsion Spring [568] in front of the Top Plate. The other end is placed over the shoulder stud of the Symbol Print Trigger [567] - Page 110 -.

224. Connect Spring [736] from Restoring Lever [540] to the Top Plate - Page 103 -.

225. Secure Non Add Key Guide [737] with Screw [739] and attach Spring [738] - Page 103 - to the Blocking Lever [200, Page 112].

226. Attach Decimal Restoring Bridge Spring [748, Page 107] to the

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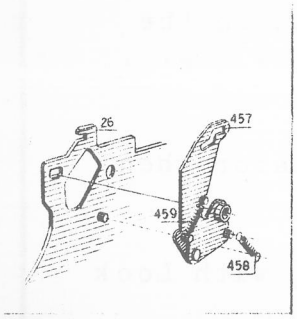

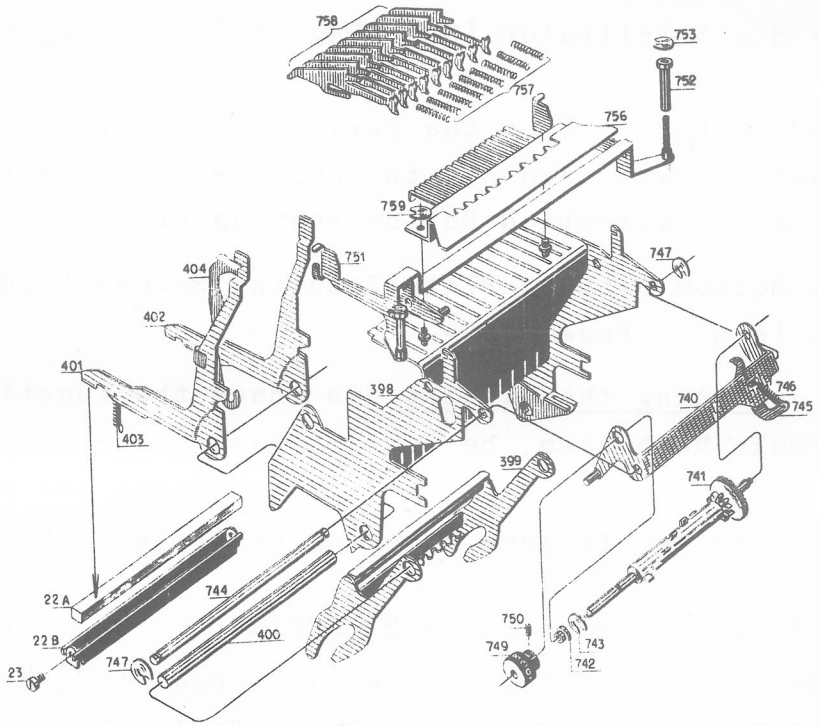

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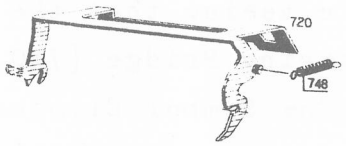

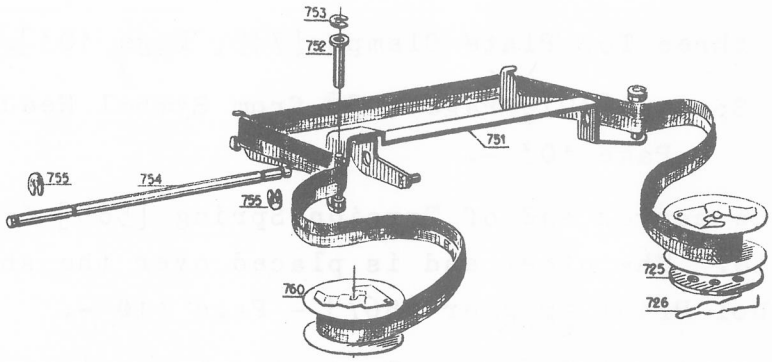

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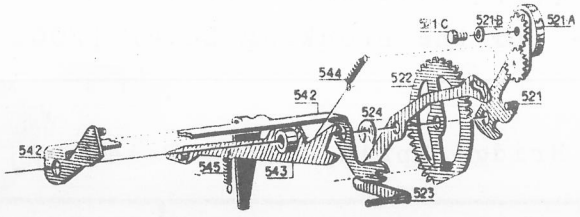

spring post of the Top Plate.

227. Install the Assembled Decimal Setting Bridge [740, Page 106] passing the left end stud through the aperture of the Printing Unit Frame and the slot of the Decimal Release Cam [457, Page 107].

228. Insert Shaft [744, Page 106] and secure it with two Retainers [747]. Positioning Lever [745, Page 106] is fulcrumed on this shaft.

229. Replace Ribbon Guide [751, Page 103] locating it under Decimal Restoring Bridge [720, Page 107]. The stud on the left side of the Ribbon Guide [751] must be located in the slot of the Bichrome Lever [523, Page 110].

230. Insert Ribbon Guide Shaft [754, Page 103] and secure with four retainers.

231. Replace Decimal Frame [756, Page 106] and secure with two retainers.

232. Finally, install Bottom Cover, Main Cover and Carriage.

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